

Paolo Macchiarini

Professor in Regenerative Medicine

Ref nr: 2-1097/2014-3

The application has been submitted: 2014-08-06 19:22:04

Day of birth 1958-08-22
Address B53 Division of ENT, CLINTEC
14186 Huddinge
Sweden
Email paolo.macchiarini@ki.se
Mobile phone
Phone 0760503213



Personal letter

To Whom It May Concern,

I appreciate the opportunity to apply for this position. I completed my surgical training in general & thoracic surgery, vascular surgery, and heart-lung transplantation. My PhD research was on tissue and organ transplantation at Paris-Sud University, Paris, France. I have also been previously appointed at Hannover Medical School, Hannover, Germany, and University of Barcelona, Barcelona, Spain as a Director for post-graduate program for Residents and Fellows in General Thoracic Surgery and organ and tissues transplantation

Since 2010, I am a Visiting Professor at Karolinska Institute, and a Director at the Advanced Center for Translational Regenerative Medicine (ACTREM) and the European Airway Institute. Currently, I am also a Professor of Regenerative Medicine at the Kuban Medical State University in Krasnodar, Russia. I have established in Sweden and Russia a multi-disciplinary research team that consists of biologist, engineers, clinicians and mathematician who can combine their expertise in the field of tissue engineering and cell therapy to investigate bench-to-beside translational research.

My primary clinical interests include the investigation of different organs and tissues in the thorax and the potential to recover and/ or reconstitute their function. In particular, adult and pediatric surgery for complex tracheal, lung, esophageal and mediastinal diseases, as well as intrathoracic, non-cardiac transplantation (lung, heart-lung and airways) and intrathoracic regenerative surgery. In 2008, our lab created transplantation history by utilizing autologous stem cells to bioengineer the world's first successful in-human transplantation of a tissue-engineered organ (windpipe) without immunosuppression. In 2011, we implanted the world's first bio-artificial windpipe using a completely artificial, lab-made nanocomposite into a 36-year-old man with late-stage tracheal cancer. Additionally, the first laryngo-tracheal artificial tissue engineered transplantation occurred in Russia in 2012 and a pediatric patient for a synthetic trachea in 2013 in the USA.

Currently, I am the primary investigator of "BIOtrachea", a five-year, multi-national, EU-funded project, which aims to deepen the understanding of regeneration in the transplantation of tissue-engineered airways. The collaboration includes 13 academic and industrial partners, who combine their expertise, to study graft production, pharmaceutical intervention, cell biology, graft-versus-host interaction, as well as the physiological and psychological effects of the patient. I am also the primary investigator for the "Regeneration of Airways and Lung" project funded by the Russian Ministry of Education and Science, which focuses on tissue engineering and cell therapy of the airways and lungs in small animals and non-human primates with clinical translation.

I currently supervise 8 doctoral and 4 postdoctoral students in various tissue engineering projects including regeneration of the diaphragm, lung, heart and esophagus. I believe with my international and national collaborators, knowledge and expertise, a full professor at Karolinska would allow me to further achieve the objectives of my research interest and to enrich and nurture the future of young prospective researchers in the field of regenerative medicine.

Please see the enclosed portfolio. Do not hesitate to contact me with any questions or concerns.

Paolo Macchiarini

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Sincerely,

Paolo Macchiarini

Questions

1. *Where did you first see the advertisement?*
I was recommended to apply
2. *If you answered "Other" to the previous question, please specify where you first saw the advertisement.*
3. *Are you currently employed at Karolinska Institutet?*
Yes, i have a temporary position

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Files and portfolio

Paolo Macchiarini Portfolio

Paolo Macchiarini Portfolio

Education

Title	University / College/Company	City	Country	From-To
PhD	University of Franche-Cômpte	Beçanson	France	1994-1997
MSc	University of Franche-Cômpte <i>Organ and Tissue Transplantation</i>	Beçanson	France	1991-1993
MS	University of Alabama <i>Masters in Biostatistics</i>	Birmingham	United States	1990-1993
MCh	University of Pisa	Pisa	Italy	1986-1991
MD	University of Pisa	Pisa	Italy	1980-1986

Work experience

Title	Company	City	Country	From-To
Full Professor	Kuban State Medical University	Krasnodar	Russian federation	2011-Current
	<i>Director of International Research, Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russia, PhD supervisor</i>			
Consultant	Karolinska University Hospital	Stockholm	Sweden	2010-2013
	<i>Clinical Sciences, Intervention & Technology, Division of Ear, Nose & Throat Diseases,</i>			
Visiting Professor of Regenerative Surgery	Karolinska Institutet	Stockholm	Sweden	2010-Current
	<i>Director, Advanced Center for Translational Regenerative Medicine (ACTREM), Karolinska Institutet, Stockholm, Sweden, PhD supervisor; Director, European Airway Institute, Karolinska Institutet, Stockholm, Sweden</i>			
Director	University Hospital Careggi	Florence	Italy	2010-2012
	<i>European Center for Thoracic Research (CERT)</i>			
Director	University Hospital Careggi	Florence	Italy	2010-2013
	<i>BIOAIRlab (Laboratory of Bioengineering & Molecular Airways)</i>			
EU Master in Respiratory Medicine	University of Barcelona	Barcelona	Spain	2008-2010
Investigator of the Institut d'Investigacions Biomèdiques August Pi i Sunyer,	University of Barcelona	Barcelona	Spain	2006-2009
	<i>PhD Supervisor</i>			
Associate Professor Surgery/Director	University of Barcelona	Barcelona	Spain	2005-2009
	<i>Director, Post-graduate Program of General Thoracic Surgery, Hospital Clínic, General Thoracic Surgery, Senior Consultant and Chairman</i>			

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PD	Hannover Medical School <i>PD - Provat Dozent: Accreditation to Full Professor (Germany)</i>	Hannover	Germany	2000-2000
Head and Chairman, Department of General Thoracic and Vascular Surgery	Hannover Medical School <i>Director, Post-graduate (Residents & Fellows) Program of General Thoracic Surgery, Hannover Medical School, Hannover, Germany</i>	Hannover	Germany	2000-2004
Head and Chairman, Department of General Thoracic and Vascular Surgery	Hannover Medical School	Hannover	Germany	1999-2004
Consultant Surgeon	Paris-Sud University <i>Dept. of Thoracic and Vascular Surgery and Heart-Lung Transplantation (*) HDR - Habilitation à Diriger la Recherche: Accreditation to Full Professor (France): 1998</i>	Le Plessis Robinson	France	1995-1999

Language

Italian	Fluent	<i>Native language</i>
German	Fluent	
English	Fluent	
French	Fluent	
Spanish	Fluent	
Catalan	Fluent	

Websites

<http://ki.se/en/clintec/actrem>

<http://www.regmedgrant.com/index.php?id=4&lang=eng>

Advanced Center for Translational Regenerative Medicine (ACTRM)

International Scientific-Research Clinical and Educational Center

References

Name	Andre Terzic
Company	Mayo Clinic, Rochester, MN
Email	terzic.andre@mayo.edu
Phone	1-507-284-5514
Name	Angela Panoskaltis-Mortari
Company	University of Minnesota, Minneapolis, MN
Email	panos001@umn.edu
Phone	(612)-626-2950
Name	Doris Anita Taylor
Company	Texas Heart Institute, Houston, TX
Email	DTaylor@texasheart.org
Phone	(832) 355-9481
Name	Alessandra Bianco
Company	Univerisity of Rome Tor Vergata

Paolo Macchiarini

Professor in Regenerative Medicine

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Email bianco@stc.uniroma2.it
Phone 390672594493

Name Mark Holterman
Company Children's Hospital of Illinois, Peoria, IL
Email Mark.j.holterman@osfhealthcare.org
Phone 309-655-3800

KAROLINSKA INSTITUTET CURRICULUM VITAE

1 NAME Paolo Macchiarini

2 BIRTH DATA

Place of Birth: Basel (CH)

Date of Birth: 22 August 1958

3 ADDRESS Mestral 26, 08348 Cabrils, Spain

4 PHONE AND EMAIL

Telephone: +46760503213

Fax: +4687747907

E-mail: paolo.macchiarini@ki.se

5 COURSES AND DEGREES

MD University of Pisa, Pisa, Italy 1980-1986

MCh University of Pisa, Pisa, Italy 1986-1991

MS Masters in Biostatistics, University
of Alabama, Birmingham, Alabama, USA 1990-1991

MSc Organ and Tissue Transplantation, University of Franche-Cômpte,
Beçanson, France 1991-1993

6 DOCTORAL DEGREE

PhD Organ and Tissue Transplantation, University of Franche-Cômpte,
Beçanson, France 1994-1997

Research Director* Paris-Sud University (HDR) 1998

PD Hannover Medical School** 2000

(*) HDR - *Habilitation à Diriger la Recherche: Accreditation to Full Professor (France)*

(**) PD – *Provat Dozent: Accreditation to Full Professor (Germany)*

7 POSTDOC APPOINTMENTS

11/1986 – 12/1989 Resident, Service of Thoracic Surgery, University of Pisa, Pisa, Italy

1/1990 – 12/1991 Fellow, Dept. of Thoracic Surgery, University of Alabama,
Birmingham, Alabama, USA

1/1992 – 12/1995 Fellow, Dept. of Thoracic & Vascular Surgery and Heart-Lung
Transplantation, Hôpital Marie-Lannelongue, Paris-Sud University,
Le Plessis Robinson, France

8 DOCENT-LEVEL COMPETENCE

3/2005 – 12/2009 Associate Professor Surgery, University of Barcelona, Barcelona,
Spain

- 1/2006 – 12/2009 Investigator of the Institut d'Investigacions Biomèdiques August Pi i Sunyer, Barcelona, Spain
- 12/2010 – present Visiting Professor of Regenerative Surgery, Karolinska Institutet, Stockholm, Sweden
- 11/2011-present Professor of Surgery, Kuban State Medical University, Krasnodar, Russia

9 CURRENT POSITION

- 10/2011 – present Consultant, Airway Transplantation, Kuban State Medical University, Krasnodar, Russia
- 12/2010 – present Director, Advanced Center for Translational Regenerative Medicine (ACTREM), Karolinska Institutet, Stockholm, Sweden
Director, European Airway Institute, Karolinska Institutet, Stockholm, Sweden
- 10/2011 – present Director of International Research, Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russia
- 11/2010 – present Visiting Professor, Karolinska Institutet, Stockholm, Sweden
- 10/2011 – present Full Professor, Kuban State Medical University, Krasnodar, Russia

10 PRIOR POSITIONS

- 8/1995 – 3/1999 Consultant Surgeon, Dept. of Thoracic and Vascular Surgery and Heart-Lung Transplantation, Hôpital Marie-Lannelongue, Paris-Sud University, Le Plessis Robinson, France
- 12/1993 – 4/1999 Thoracic Surgery and Transplantation, Paris-Sud University, Paris, France
- 4/1999 – 12/2004 Head and Chairman, Department of General Thoracic and Vascular Surgery, Heidehaus Hospital, Hannover Medical School, Hannover, Germany
- 4/2000 – 12/2004 Thoracic Surgeon, Hannover Medical School, Hannover, Germany
Director, Post-graduate (Residents & Fellows) Program of General Thoracic Surgery, Hannover Medical School, Hannover, Germany
- 1/2003 – 12/2007 European Association of CardioThoracic Surgery School- Airway Surgery, Bergamo, Italy
- 1/2005 – 12/2009 Senior Consultant and Chairman, Department of General Thoracic Surgery Hospital Clinic, University of Barcelona, Barcelona, Spain
- 3/2005 – 12/2009 Director, Post-graduate Program of General Thoracic Surgery, Hospital Clínic, Universitat de Barcelona, Barcelona, Spain
PhD Supervisor, General Thoracic Surgery, Universidad de Barcelona, Barcelona, Spain
- 12/2005 – 12/2009 Associate Professor, General Thoracic Surgery, Universitat de Barcelona, Barcelona, Spain

3/2005 – 12/2009	General Thoracic Surgeon, Universidad de Barcelona, Barcelona, Spain
2/2007 – 12/2009	Master en Transplante de Órganos. Universidad de Barcelona, Barcelona, Spain
4/2008 – 12/2010	EU Master in Respiratory Medicine. Universidad de Barcelona, Barcelona, Spain
1/2010 – 9/2012	Director, European Center for Thoracic Research (CERT), University Hospital Careggi, Florence, Italy Director, BIOAIRlab (Laboratory of Bioengineering & Molecular Airways), University Hospital Careggi, Florence, Italy
12/2010 – 12/2013	Consultant, Department Clinical Sciences, Intervention & Technology, Division of Ear, Nose & Throat Diseases, Karolinska University Hospital, Stockholm, Sweden

11 TIME DEDUCTED FROM ACTIVE RESEARCH TIME

None

12 SELECTED ACADEMIC DISTINCTIONS AND OTHER MERITS

- “Mejor Idea Médica” (2005), Diario Médico (E)
- Member of the Fleischner Society:

“The Fleischner Society is an **international, multidisciplinary medical society** for thoracic radiology, dedicated to the diagnosis and treatment of diseases of the chest. Founded in 1969 by eight radiologists whose predominant professional interests were imaging of chest diseases, the Society was named in memory of Felix Fleischner, an inspiring educator, clinician, and researcher who made many contributions to the field of chest radiology. The Society has had an active membership of approximately **65 members throughout its existence** as well as approximately 35 senior members, who have retired from active medical practice or work in medical science after years of active membership in the Society.

The Fleischner Society maintains a diverse membership that **includes experts in adult and pediatric radiology, pathology, adult and pediatric pulmonary medicine, thoracic surgery, physiology, morphology, epidemiology and other related sciences**. The diverse membership supports a primary role of the Society, which is the publication of Fleischner Position Papers, which represent consensus documents that focus on controversial topics.”

<http://fleischner.org/?s=paolo+macchiarini>

- Knight for scientific merits of the Republic of Italy (2010)
<http://www.quirinale.it/elementi/Onorificenze.aspx?pag=0&qIdOnorificenza=&cognome=macchiarini&nome=paolo&daAnno=1800&aAnno=2014&luogoNascita=&testo=&ordinamento=2>

13 LANGUAGE SKILLS

German, French, English, Italian, Spanish, Catalan

14 REFERENCES

Andre Terzic, MD, PhD

Professor of Medicine and Pharmacology in Molecular Pharmacology and Experimental Therapeutics, Medical Genetics

Mayo College of Medicine

Michael S. and Mary Sue Director, Mayo Clinic Center for Regenerative Medicine

Marriott Family Endowed Chair in Cardiovascular Research

Chair, Discovery-Translation Scientific Advisory Board

Theme Leader, Regenerative Medicine and Transplantation

Director, Marriott Heart Disease Research Program

Director, National Institutes of Health Training Program in "Cardiovasology"

Board of Directors, Mayo Collaborative Services

Mayo Clinic, Rochester, MN

Tel: 1-507-284-5514

Email: terzic.andre@mayo.edu

Angela Panoskaltis-Mortari, PhD, (ABMLI)

Professor, Department of Pediatrics, Division of Blood and Marrow Transplantation &

Division of Pulmonary, Allergy, Critical Care and Sleep Medicine

Director, Cytokine Reference Lab (www.cytokinelab.umn.edu)

University of Minnesota

Mail: MMC 366 Mayo, 420 Delaware St. SE

Overnight delivery: 660E MCRB, 425 East River Rd.

Minneapolis, MN 55455

Tel (612)-626-2950

Fax: (612) 626-4074

Email: panos001@umn.edu

Doris Anita Taylor, PhD, FAHA, FACC

Director Regenerative Medicine Research

Texas Heart Institute

6720 Bertner Ave., MC 2-255

Houston, TX 77030

Tel: (832) 355-9481

Fax: (832) 355-9552

Email: DTaylor@texasheart.org

Alessandra Bianco, PhD

Professor, Department of Industrial Engineering

Univeristy of Rome Tor Vergata

Viale del Politecnico 00133 Roma

skype contact: alebianco1

Tel: +390672594493

Cell: 3207983051

Email: bianco@stc.uniroma2.it

KAROLINSKA INSTITUTET CURRICULUM VITAE

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2 BIRTH DATA

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6 DOCTORAL DEGREE

PhD	Organ and Tissue Transplantation, University of Franche-Cômpte, Beçanson, France	1994-1997
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(**) PD – *Provat Dozent: Accreditation to Full Professor (Germany)*

7 POSTDOC APPOINTMENTS

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1/1990 – 12/1991	Fellow, Dept. of Thoracic Surgery, University of Alabama, Birmingham, Alabama, USA
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Director, National Institutes of Health Training Program in "Cardiovasology"

Board of Directors, Mayo Collaborative Services

Mayo Clinic, Rochester, MN

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Email: terzic.andre@mayo.edu

Angela Panoskaltis-Mortari, PhD, (ABMLI)

Professor, Department of Pediatrics, Division of Blood and Marrow Transplantation & Division of Pulmonary, Allergy, Critical Care and Sleep Medicine

Director, Cytokine Reference Lab (www.cytokinelab.umn.edu)

University of Minnesota

Mail: MMC 366 Mayo, 420 Delaware St. SE

Overnight delivery: 660E MCRB, 425 East River Rd.

Minneapolis, MN 55455

Tel (612)-626-2950

Fax: (612) 626-4074

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Doris Anita Taylor, PhD, FAHA, FACC

Director Regenerative Medicine Research

Texas Heart Institute

6720 Bertner Ave., MC 2-255

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Alessandra Bianco, PhD

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KAROLINSKA INSTITUTET

SCIENTIFIC PORTFOLIO

1 CURRENT SCIENTIFIC ACTIVITY

Both congenital and acquired end-stage organ failure is a worldwide major challenge for medicine and this can worsen due to demographic changes. Despite enormous efforts in medical and basic research, allogeneic organ transplantation is so far the only curable treatment option for these patients. However, conventional transplantation is associated with a shortage of donor organs and a lifetime of immunosuppressant, which is a non-ideal solution. Regenerative Medicine (RM), including tissue engineering (i), cell therapy (ii) and pharmaceutical intervention (iii), is a new promising concept of repairing or replacing human cells, tissues, or organs in order to restore or establish normal physiological function. Recently, there is available evidence that recognizes the RM field to be a promising option. This includes an interdisciplinary approach to repair, replace and/or regenerate dysfunctional tissues and organs by tissue engineered replacement, stem cell-based therapy and pharmaceutical interventions to treat otherwise untreatable end-stage and malignant diseases. In effect, Doris Taylor and colleagues demonstrated the feasibility to engineer an entire heart with functional properties in a small animal model. Ott and Niklason demonstrated similar results for lung tissue under experimental conditions. Clinical transfer has been realized for bladder replacements (Atala A et al.), heart valves (Cebotari S et al.) and completely tissue engineered human tracheas (Macchiarini et al. 2008). Several cell-based therapies showed both in experimental and clinical settings their potential to improve a variety of diseases and disorders (cardiac diseases, parkinson's disease, Graft-Versus-Host Disease, pulmonary diseases). More recently the world's first transplantations of synthetic-based tracheal grafts were performed in several patients around the world (Jungebluth et al. 2011 and 2014). My current scientific activities aim to continue the already achieved work and further improve the clinical concept of tracheal tissue engineering involving more local and international research and clinician network.

i) Tissue Engineering

The main focus is the incorporation of novel materials into the currently applied concept of clinical transplantation of a synthetic tracheal graft. To this end I am building up a strong collaboration with local and national researchers and suppliers to create ideal-tissue engineered solution for patients suffering from tracheal disorders. Besides, I will focus on the transfer of our concept of tracheal tissue engineering using both biological and synthetic scaffolds seeded with autologous stem cells to other tissues/organs. Currently, we are also successfully working on the following tissues/organs: -

- a. heart tissue (patches and full organ regeneration)
- b. lung tissue
- c. diaphragm
- d. esophagus
- e. laryngeal
- f. ureter
- g. kidney
- h. liver
- i. brain

Aside from extensive *ex vivo* and *in vitro* work, such as the improvement of decellularization and reseeded techniques, the characterization of the scaffold, cell-surface interactions and differentiation of cells, I will focus on the *in vivo* transfer with the overall aim of clinical translation. Beside these biological aspects my research group investigates the different synthetic materials (both non-degradable and biodegradable structures) using a variety of novel methodologies (3-D printing, electrospinning). Tissue engineering employs the principles of stem-cell/regenerative medicine, and combines it with engineering and materials specialist knowledge and methods, in order to produce transplantable organs and tissues *in vitro*. The engineered nature of this process allows complete customization of *in vitro* organ development, ensuring optimal post-transplantation prognosis.

ii) Cell therapy and cell biology

Various cell types such as mononuclear cells, mesenchymal stem cells have been already applied clinically in different scenarios and data suggest the beneficial effect for patients. Particularly when complex organ structures are involved, the tissue engineering approaches may fail to reconstruct the tissue and restore function. Cell therapy has a high translational capacity due to its easy handling and application. However, the misuse, unknown underlying mechanism and side effects, must be considered prudently. Before clinical application becomes routine, further in-depth investigation of associated pathways and potential complications should be performed in animal models (both in small and large animals).

My current activities in cell therapy and cell biology include the investigation of the following diseases and their response to cell-based therapies, using stem cells:

- Myocardial infarction
- Pulmonary hypertension
- Asthma
- Chronic obstructive pulmonary diseases
- Acute respiratory distress syndrome
- Ulcers

In the different disease models, besides investigating the different underlying physio/pathological mechanism, I would also like to emphasise on more basic and profound issues such as the optimization of cell administration and/or the cell fate post-application, using various mathematical modelling. My further interests are in stem cell biology, mainly their responses to radiation therapy and both resident and cancer stem cell in the airways. My group is currently working on various aspects of cell differentiation and cell-surface interactions. In the context of cell differentiation and cell-surface interaction, I will further determine the different mechanisms together with our collaborative partners at the global level expression of microRNA, epigenetics and proteomics by computational biology.

iii) Pharmaceutical intervention and bioactive molecules

Recently we could demonstrate the beneficial effect of using bioactive molecules and pharmaceutical intervention. I am focused on the effect of different molecules and substances and their impact on the regenerative processes within the organism. Currently, we are focusing on the systemic and local administration of boosting and growth factors, such as granulocyte stimulating factor (GCSF), Erythropoietin (EPO) and transforming growth factor (TGF- β) to increase the endogenous regeneration of the body. Both experimental and initial clinical findings in trachea TE demonstrated the

high potential of using these drugs/reagents 1) to mobilize stem/progenitor cells into the peripheral circulation, 2) to down-regulate apoptosis of mobilized cells and 3) to differentiate stem cells into distinct cell type. Since recently, together with our collaborative partners, I am further extending our investigation on the beneficial effect of selected exosomes in the context of endogenous regeneration. The significant effect of pharmaceutical intervention could be approved both experimentally (Jungebluth et al.) and clinically (Jungebluth et al.). Our experience demonstrated that there are a great many advantages to the use of a patient's own precursor cells, including but not limited to the lack of requirement for immunosuppression.

2 SCIENTIFIC PUBLICATIONS

2.1 Bibliometric parameters

143 original articles, 30 reviews, 54 book chapters

H index: 36

Total number of citations: 4964

Total number of peer-reviewed publications in the last 10 years (2004-2014):

H index: 20

Total number of citations in the past 10 years: 1821

2.2 List of all original works

Peer reviewed reviews

1. Darteville P, Macchiarini P. Carinal resections for lung cancer. *Jap J Thorac Surg* 11(7):890-898, 1997.
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143. Jungebluth P, Haag JC, Sjöqvist S, Gustafsson Y, Beltrán Rodríguez A, Del Gaudio C, Bianco A, Baiguera S, Lemon G, Lim ML, Macchiarini P. Tracheal tissue engineering in rats. *Nature Protocol*. (in press) (IF:7.782)

2.3 The ten most-cited publications

1. **Macchiarini P**, Fontanini G, Hardin M, Squartini F, Angeletti CA. Relation of neovascularization to metastasis in non-small cell lung cancer. *Lancet* 340:145-146, 1992. **Times cited: 748**
2. **Macchiarini P**, Jungebluth P, Go T, Asnaghi MA, Rees LE, Cogan TA, Dodson A, Martorell J, Bellini S, Parnigotto PP, Dickinson SC, Hollander AP, Mantero S, Conconi MT, Birchall MA. Clinical transplantation of a tissue-engineered airway. *Lancet* 372:2023-30,2008. **Times cited: 505**
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7. **Macchiarini P**, Fontanini G, Hardin M, Hsu C, Bigini D, Vignati S, Pingitore R, Angeletti CA. Blood vessel invasion by tumour cells predicts recurrence in completely resected T1N0M0 non-small cell lung cancer. *J Thorac Cardiovasc Surg* 106:80-89, 1993. **Times cited: 100**
8. Geneste O, Camus AM, Castegnaro M, Petruzzeli S, **Macchiarini P**, Angeletti CA, Giuntini C, Bartsch H. Comparison of pulmonary DNA adduct levels, measured by 32P-postlabelling, and arly hydrocarbon hydroxylase activity in lung parenchyma of smokers and ex-smokers. *Carcinogenesis* 12: 1301-1305, 1991. **Times cited: 92**
9. Badylak SF, Weiss DJ, Caplan A, **Macchiarini P**. Engineered whole organs and complex tissues. *Lancet* Mar;379(9818); 943-952, 2012. **Times cited: 93**
10. Dulmet E, **Macchiarini P**, Suc B, Verley JM. Germ cell tumors of the mediastinum- a 30 year experience. *Cancer* 72:1894-1901, 1993. **Times cited: 88**

2.4 The ten most important publications (in chronological order)

1. **Macchiarini P**, Fontanini G, Hardin M, Squartini F, Angeletti CA. Relation of neovascularization to metastasis in non-small cell lung cancer. *Lancet* 340:145-146, 1992. (IF 39.207)
PMID:1378165
First evidence that the intensity of angiogenesis correlates with metastasis in non-small-cell lung cancer.
2. Lotz J, **Macchiarini P**. Double aortic arch: diagnosis by MRI. *N Engl J Med* 25:351(22), 2004. (IF 54.420)
PMID:15564538
Case study of double aortic arch diagnosed in a 6 month old by MRI
3. **Macchiarini P**, Ostertag H. Uncommon primary mediastinal tumours. *Lancet Oncol*;5:107-18, 2004. (IF 24.725)
PMID:14761815
Review of uncommon primary mediastinal tumours including primary thymic carcinomas, neuroendocrine carcinomas, germ-cell tumours, lymphomas, and neurogenic, endocrine and mesenchymal tumours.
4. **Macchiarini P**. Primary tracheal tumours. *Lancet Oncol* 7:83-91, 2006. (IF 24.725)
PMID: 16389188
This article describes the first staging system for malignant primary tracheal tumours
5. **Macchiarini P**, Jungebluth P, Go T, Asnaghi MA, Rees LE, Cogan TA, Dodson A, Martorell J, Bellini S, Parnigotto PP, Dickinson SC, Hollander AP, Mantero

- S, Conconi MT, Birchall MA. Clinical transplantation of a tissue-engineered airway. *Lancet* 372: 2023-30, 2008. (IF 39.207)
PMID: 19022496
This reports the first in man tissue-engineered transplant of a complex organ, the windpipe: a patient affected by endstage post-tuberculosis malacia was transplanted using a six-centimeter decellularized cadaveric tracheal segment and the recipient's own stem and respiratory cells.
6. Asnagli MA, Jungebluth P, Raimondi MT, Dickinson SC, Rees LE, Go T, Cogan TA, Dodson A, Parnigotto PP, Hollander AP, Birchall MA, Conconi MT, **Macchiarini P**, Mantero S. A double-chamber rotating bioreactor for the development of tissue-engineered hollow organs: From concept to clinical trial. *Biomaterials* 29:5260-9, 2009. (IF 8.312)
PMID: 19647867
The development of a rotating double-chamber bioreactor permits the efficient repopulation of a decellularized human matrix, a concept that can be applied clinically, as demonstrated by the successful tracheal transplantation.
7. Jungebluth P, Alici E, Baiguera S, Le Blanc K, Blomberg P, Bozóky B, Crowley C, Einarsson O, Grinnemo KH, Gudbjartsson T, Le Guyader S, Henriksson G, Hermanson O, Juto JE, Leidner B, Lilja T, Liska J, Luedde T, Lundin V, Moll G, Nilsson B, Roderburg C, Strömblad S, Sutlu T, Teixeira AI, Watz E, Seifalian A, **Macchiarini P**. Tracheobronchial transplantation with a stem-cell-seeded bioartificial nanocomposite: a proof-of-concept study. *Lancet*; 378(9808):1997-2004, 2011. (IF 39.207)
PMID:22119609
This reports the first in man tissue-engineered bioartificial transplant of the tracheobronchial airway using a tailored bioartificial nanocomposite previously seeded with autologous bone-marrow mononuclear cells via a bioreactor for 36 h and analysed.
8. Badylak SF, Weiss DJ, Caplan A, **Macchiarini P**. Engineered whole organs and complex tissues. *Lancet* Mar;379(9818); 943-952, 2012. (IF: 39.207).
PMID:22405797
A new approach to treat failing organ and tissues involving the use of three-dimensional biological scaffolds made of allogeneic or xenogeneic extracellular matrix derived from non-autologous sources.
9. Gonfiotti A, Jaus MO, Barale D, Baiguera S, Jungebluth P, Comin C, Lavorini F, Fontana G, Sibila O, Rombolà G, **Macchiarini P**. 5-YEAR follow-up of the first tissue engineered airway transplantation. *Lancet* Jan;383(9913):238-44, 2014. (IF: 39.207)
PMID:24161821
This describes the mechanical and functional results of the first tissue engineered airway transplant(s) after 5 years
10. Sjöqvist S, Jungebluth P, Lim ML, Haag JC, Gustafsson Y, Lemon G, Baiguera S, Burguillos MA, Del Gaudio C, Simonsson OE, Rodriguez AB, Sotnichenko A, Kublickiene K, Ulman H, Kielstein H, Damberg P, Bianco A, Joseph B, D Ribatti, Heuchel R, Ibarra C, Zhao Y, Taylor DA, **Macchiarini, P**. Experimental orthotopic transplantation of a tissue engineered esophagus in rats. *Nature Comm* Apr 15;5:3562, 2014 (IF:10.742)

PMID:24736316

Describes how to decellularize rat esophagi inside a perfusion bioreactor to create biocompatible biological rat scaffolds

2.5 List of general articles and book chapters

1. Macchiarini P, Chella A, Ducci F, Rossi B, Bevilacqua G, Angeletti CA: Neoadjuvant chemotherapy for invasive thymoma: an interim analysis. ***Neoadjuvant Chemotherapy***. (Banzet P, Holland JF, Khayat D, Weil M, eds.), Springer Verlag, Paris, 373-375, 1991.
2. Dartevelle P, Chapelier A, Macchiarini P. Exerese par voie transcervical des cancers broncho-pulmonaires envahissant la jonction l'apex. ***Encyclopédie Médico Chirurgicale*** 42-305:1-8, 1993.
3. Dartevelle P, Macchiarini P. Iterative resections for recurrent and second primary bronchogenic carcinomas. ***New Frontiers in Lung Cancer*** (Motta G, ed), Genoa, 54-55, 1993.
4. Dartevelle P, Macchiarini P, Chapelier A. Resection for T3/4 lesions. ***New Frontiers in Lung Cancer*** (Motta G, ed), Genova,. 46-47, 1993.
5. Macchiarini P, Dulmet E, Fontanini G, Chapelier A, Lenot B, Cerrina J, Dartevelle P. Angiogenesis: a novel target for adjuvant therapy in locally advanced non-small cell lung cancer. ***Cancer Treatment. An update*** (Banzet P, Holland JF, Khayat D, Weil M, eds.), Springer Verlag, Paris. 336-342, 1994.
6. Macchiarini P, Dulmet E, de Monpreville V, Chapelier A, Lenot B, Cerrina J, Dartevelle P. Extended resection of residual post-chemotherapy malignant non-seminomatous germ-cell tumors of the mediastinum: Is it worthwhile? ***Cancer Treatment. An update*** (Banzet P, Holland JF, Khayat D, Weil M, eds.), Springer Verlag, Paris. 503-509, 1994.
7. Hardin JM, Macchiarini P, Singh KP. A statistical model for investigating adjuvant chemotherapy in T1N0M0 non-small cell lung cancer. ***Cancer Treatment. An update*** (Banzet P, Holland JF, Khayat D, Weil M, eds.), Springer Verlag, Paris. 343-347, 1994.
8. Macchiarini P, Dartevelle P. Tracheal Transplantation: Will New Advances in Surgical Techniques Unlock The Door? ***Acta Biomedica***. 65; 51-58, 1994.
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35. Macchiarini P. Primary tracheal tumors. ***Mesotelioma pleurico maligno e tumori del polmone*** (F. Carpagnano, ed.). Ragusa Modugno, Bari, Italy, 269-276, 2007.

36. Macchiarini P. Right Carinal Lobectomy and Pneumonectomy. ***Operative Techniques in Thoracic and Cardiovascular Surgery: A Comparative Atlas.*** Elsevier, Philadelphia, Pennsylvania, US. Vol. 12, Issue 3, pp 210-223, 2007.
37. Go T, Macchiarini P. Open approaches to posterior mediastinal tumors. ***Technical Advances in Mediastinal Surgery*** (Ed. Tommaso Mineo, *ed.*). Thoracic Surgery Clinics. Elsevier Philadelphia, Pennsylvania, US. 20(2):285-295, 2010.
38. Baiguera S, Macchiarini P. Trachea. ***Regenerative Medicine – From Protocol to Patient.*** (G Steinhoff, *ed.*), Springer Publ., London, UK, 691-711, 2011.
39. Lim ML, Jungebluth P, Macchiarini P. The Implications of Stem Cell Applications for Diseases of the Respiratory System. In: ***Adv Biochem Eng Biotechnol, Mesenchymal Stem Cells- Basics and Clinical Application II.*** (Weyland *ed.*) Springer-Verlag, Berlin Heidelberg, Germany, 2012.
40. Baiguera S, Macchiarini P. Airway Biological Engineering. In: ***A Manual of Current therapies in Regenerative medicine.*** Imperial College Press, World Scientific Publishing Group, London, UK. 2013.
41. Lemon G, King JR, Macchiarini P. Mathematical modelling of regeneration of a tissue-engineered trachea. ***Studies in Mechanobiology, Tissue Engineering and Biomaterials*** (Geris Liesbet, *ed.*). Springer AG, Heidelberg, Germany. Xi, Vol 10, 2013.
42. Gonfiotti A, Macchiarini P. Tracheomalacia. ***European Society of Thoracic Surgeons textbook of Thoracic Surgery*** (AsamuraH, CassiviS, DetterbeckF, Goldstraw P, Kuźdżał J, Lerut A. Treasure T, *eds.*). Medycyna Praktyczna S.J., Varsavia, Poland, Ch. 35, 2013.
43. Jaus M, Macchiarini P. Esophagus - operative techniques: esophageal-tracheal or bronchial fistula. ***European Society of Thoracic Surgeons textbook of Thoracic Surgery*** (AsamuraH,CassiviS, DetterbeckF, Goldstraw P,Kuźdżał J, Lerut A. Treasure T, *eds.*). Medycyna Praktyczna S.J., Varsavia, Poland, 2013.
44. Baiguera S, Jaus M, Gonfiotti A, Macchiarini P. Trachea and Larynx in Regenerative Medicine. ***Biomaterials for stem cell therapy: state of art and vision for the future*** (De Bartolo L, Bader A *ed.*) CRC Press, Boca Raton, Florida, US. 2013.
45. Baiguera S, Damasceno KL, Macchiarini P. Detergent-enzymatic method for bioengineering human airways. ***Organ Perfusion and Culture Methodology. Methods in Bioengineering*** (Lee C, Uygun K, *eds.*) Artech House. Boston, USA, 2010.
46. Gonfiotti A, Macchiarini P. Tracheal transplantation. ***Cardiothoracic Surgery Review.*** (Franco K, Thourani VH, *eds.*), Lippencott Williams & Wilkins, Philadelphia, Pennsylvania, USA, 2011.
47. Jaus M, Macchiarini P. Superior sulcus tumors. ***Cardiothoracic Surgery Review.*** (Franco K, Thourani VH, *eds.*), Lippencott Williams & Wilkins, Philadelphia, Pennsylvania, USA, 2011.

48. Baiguera S, Macchiarini P. Regenerative Therapies-Trachea. **Regenerative Medicine – From Protocol to Patient**. (2nd edition) (G Steinhoff, ed.), Springer Publ., London, UK, 2013.
49. Jungebluth P, Macchiarini P. Clinical potential of mesenchymal stem cells for treatment of lung diseases. In: *Advances in Biochemical Engineering/Biotechnology: Mesenchymal stem cells - origin and characteristics, functions and perspectives for clinical use* (P Vogt, ed.) Springer Verlag, Berlin, Germany. 2014 (*in press*).
50. Sanmartino F, Jungebluth P, Macchiarini P. Surgery of the trachea. In: **Lung Cancer (Fourth Edition)**. (Jack A. Roth, Waun Ki Hong and Ritsuko U. Komaki, eds). Wiley-Blackwell, Oxford, UK). 2014 (*in press*)
51. Sammartino F, Macchiarini P. Primary Tracheal Tumors. In: **Lung Cancer. (Fourth Edition)**. (Roth J, Ki Hong W, Komaki R, ed.) John Wiley & Sons, Inc, Hoboken, New Jersey, US. 2014 (*in press*),
52. Sjoqvist S, Macchiarini P. Tissue Engineering of the Esophagus. In **Stem Cell Biology and Tissue Engineering in Dental Sciences**. Elsevier, USA. 2014 (*in press*).
53. Baiguera S, Macchiarini P. The Bio-Artificial Trachea. In **Stem Cell Biology and Tissue Engineering in Dental Sciences**. Elsevier, USA. 2014 (*in press*).
54. Lim ML, Jungebluth P, Macchiarini P. Regenerative Medicine for Diseases of the Respiratory System. In **Translational Regenerative Medicine**. Elsevier, USA. 2014 (*in press*).

2.6 List of all other scientific works

1. **Macchiarini P**, Birchall M. Stem-Cell “Hype” in Tracheal Transplantation? A Response. *Transplantation* 90 (8): 928-9, 2010.
2. **Macchiarini P**. Authors’ reply re: Stem-cell-based, tissue-engineered tracheal replacement in a child. *Lancet* (381)113, 2013.
3. **Macchiarini P**. Reply to the Editor re: The trachea: The First tissue-engineering organ? *J Thor and CV Surg* 148(1): 365-6. 2014.

3 INTERNATIONAL SCIENTIFIC CONGRESSES

3.1 Invited speaker or chair

1. Lung cancer and angiogenesis. *6th World Conference on Lung Cancer*. Melbourne, Australia. November 10-14, 1991.
2. Extended resection for non-small cell lung cancer. *2nd International Meeting "Cardiac diseases in cancer patients"*. Pordenone, Italy. April 15-17, 1994.
3. *2nd International Symposium on Thoracoscopy and Video Assisted Thoracic Surgery*. 75th Annual Meeting American Association of Thoracic Surgery, New York, US. April 24-27, 1994.

4. *1st International Symposium In Recent Advances Of Thoracic And Thoracoscopic Surgery*. Riyadh Medical Complex, Saudi Arabia. November 12-14, 1996.
5. Lung Xenotransplantation. *General Thoracic Biology Club*. 77th Annual Meeting of the American Association of Thoracic Surgery. Washington DC, US. May 4, 1997.
6. Management of Superior Sulcus Tumors. *Harvard Medical School*. Boston, US. May 22, 1997.
7. *Current status of lung transplantation*. Forli, Italy, June 20, 1997.
8. Lung transplantation. *University of Laval*. Quebec, Canada. July 22, 1997.
9. Extended resection for lung cancer. *European School of Oncology*. Royal Brompton Hospital, London, UK. October 10-14, 1997.
10. Epidemiology of lung diseases and its impact on thoracic surgery. In: *Management course in cardio-thoracic surgery*. Palma de Mallorca, Spain. November 23-25, 1997.
11. Extended resections for lung cancer. *Hannover Medical School*, Hannover, Germany. June 5, 1998.
12. Surgical management of stage IIIB and IV lung cancer. *51st Annual Meeting of the Japanese Association of cardiothoracic surgery*. Tokyo, Japan). October 2-5, 1998.
13. The future of lung transplantation: lung xenotransplantation. *51st Annual Meeting of the Japanese Association of cardiothoracic surgery*. Tokyo, Japan. October 2-5, 1998.
14. Surgery for locally advanced lung cancer. *Kanazawa University*, Kanazawa, Japan. October 7, 1998.
15. Surgical replacement of the superior vena cava: indications, technique and results. *Surgery Meets high-tech in the information age*. Munich, Germany. December 10, 1998.
16. Extended resection for lung cancer. *International College of Surgeons*. San Lorenzo de El Escorial, Spain. June 17-18, 1999.
17. Lung Xenotransplantation. *International College of Surgeons*. San Lorenzo de El Escorial, Spain. June 17-18, 1999.
18. Extended resection for locally advanced non-small cell lung cancer. *Homburg University*. Homburg, Germany. January 15, 2000.
19. Is there a role of surgery for N3 non-small cell lung cancer? Post-graduate course in General Thoracic Surgery. *Italian Society of Thoracic Surgery*. Bari, Italy, October 7-8, 2000.

20. The thoracic inlet: Gateway to the chest. *University of Bristol*, Bristol (UK), November 23, 2000.
21. International training of a general thoracic surgeon. Thoracic surgery postgraduate course. *87th American College of Surgeons*. New Orleans, US. October 18, 2001.
22. Surgical management of the subglottic airway. *Royal Bristol Infirmary*. University of Bristol. Bristol, UK. November 12, 2001.
23. The bioartificial Lung. *31st Annual Meeting German Society for Thoracic and Cardiovascular Surgery*. Leipzig, Germany. February 17-20, 2002.
24. Advances in tracheal surgery. *5th Congress Turkish Thoracic Society*. Antalya, Turkey. April 24-28, 2002.
25. Pulmonary Thromboendarterectomy. *5th Congress Turkish Thoracic Society*. Antalya, Turkey. April 24-28, 2002.
26. Superior sulcus tumors. *NATO- advanced research seminar in thoracic oncology*. Kroshnava, Russia. April 29, 2002.
27. Chronic thromboembolic pulmonary disease. *Institute of Pneumology and Thoracic Surgery*. University of Barcelona. Barcelona, Spain. May 14, 2002.
28. Recent advances in tracheal surgery. *Institute of Pneumology and Thoracic Surgery*. University of Barcelona. Barcelona, Spain. May 14, 2002.
29. Apnoeic tracheal surgery. *General Thoracic Surgery Post-graduate Course EACTS*, Monaco. September 22, 2002.
30. Pancoast Tumors. *Post-graduate course in General Thoracic Surgery*. German Society for Thoracic and Cardiovascular Surgery. Kiel, Germany, October 8, 2002.
31. Pulmonary thromboendarterectomy. *University of Palermo*. Palermo, Italy, November 8, 2002.
32. Surgery of the superior vena cava. Deep venous surgery and new technologies for varicose veins. *Updating Course in Vascular Pathology of Surgical Interest. III Edition*. University of Pisa. Pisa, Italy. November 30-December 1, 2002.
33. How I do it: Carinal resections. *Post-graduate Course General Thoracic Surgery*. *83rd AATS Meeting*. Boston, US, May 3, 2003.
34. Trachea substitutes. *3rd Sheffield Seminar in Thoracic Surgery*. Sheffield, UK. May 15-16, 2003.
35. Principles of cardiopulmonary bypass, ECMO, artificial lung. *European School of Cardiothoracic surgery*. Bergamo, Italy. June 2, 2003.
36. Surgery of the upper thoracic aperture. *1st Post-graduate course of the German-Italian Thoracic surgery*. Bolzano, Italy, November 21-22, 2003.

37. Implication of interferon- β on the mediastinal lymphangiogenesis. *Post-graduate course of the 26th German Oncology Congress*. Berlin, Germany. February 28-March 2, 2004.
38. Anatomy, function and Imaging of the trachea. *European School of Cardiothoracic surgery*. Bergamo, Italy. June 4-6, 2004.
39. Diagnosis and therapy of benign tracheal stenosis and tracheoesophageal fistulas. *European School of Cardiothoracic surgery*. Bergamo, Italy. June 4-6, 2004.
40. Surgical management of tracheal tumors. *European School of Cardiothoracic surgery*. Bergamo, Italy. June 4-6, 2004.
41. Principles of paediatric trachea surgery. *European School of Cardiothoracic surgery*. Bergamo, Italy. June 4-6, 2004.
42. Conferencia entre especialidades médicas relacionadas: conflicto o viabilidad. *VIII Foro Cardiovascular*. Madrid, Spain. March 11-12, 2005.
43. Conferencia Magistral: Tratamiento quirúrgico y endoscópico del enfisema pulmonar. *23 Diada Pneumològica de la Sociedad Catalana de Pneumologia (SOCAP)*. Sant Cugat. Barcelona, Spain. April 8-9, 2005.
44. *XII Annual Meeting of the German Society of Thoracic Surgery*. Berlin, Germany. June 1-5, 2005.
45. Tratamiento actual de la hipertensión pulmonar tromboembólica crónica: Opciones quirúrgicas. *Congreso Anual de la Sociedad Española de Neumología y Cirugía Torácica (SEPAR)*. Valencia, Spain. June 10-13, 2005.
46. Advances in chronic thromboembolic pulmonary hypertension: Experience of the spanish groups. *VIII Annual Meeting of the Pulmonary Circulation Working Group Spanish Society of Cardiology*. Alicante, Spain. November 11, 2005.
47. La Chirurgia della trachea: indicazioni e problematiche. *II Giornata di Patologia Toracica*. Catania, Italy. February 23-26, 2006.
48. The actual status of the artificial lung. *2nd General Thoracic Surgery Course*. Bursa, Turkey, June 15-17, 2006.
49. Surgical Management of airway disease. *British resident annual meeting*. Crew, UK. February 3, 2006.
50. La Chirurgia della trachea: indicazioni e problematiche. *II Giornata di Patologia Toracica*. Catania, Italy, February 23-26, 2006.
51. Tratamiento multimodal del tumor de pancoast. *3^a Jornada de Radioquimioterapia en el Cáncer de Pulmón*. Barcelona, Spain. April 21, 2006.
52. Tissue engineered trachea. *Annual meeting of the Japanese Society of Chest Surgery*. Tokyo, Japan. May 25-27, 2006.

53. The actual status of the artificial lung. *2nd General Thoracic Surgery Course*. Bursa, Turkey. June 15-17, 2006.
54. Trachea surgery in children. *2nd General Thoracic Surgery Course*. Bursa, Turkey, June 15-17, 2006.
55. Limits of airway surgery. *2nd General Thoracic Surgery Course*. Bursa, Turkey, June 15-17, 2006.
56. Utilización de trasplante de vasos cadavéricos en el tratamiento quirúrgico de los tumores intratorácicos. *III Congreso Oncológico para Profesionales Sanitarios*. Benavente, Spain, October 20-21, 2006.
57. Tratamiento quirúrgico de la hipertensión arterial pulmonar. Hipertensión Pulmonar. *IV Curso práctico de actualización cardiovascular*. Barcelona, Spain. November 2-3, 2006.
58. Tumor primitivi della via aerea superiore. *XI Sessione. NSCLC-Terapia Chirurgia. Congresso Oncologia Toracica. Lo stato dell'arte alla fine del 2006*. Bari, Italy, November 30 – December 2, 2006.
59. État actuel de la chirurgie trachéal. *Congreso de la Société Marocaine des Maladies Respiratoires*. Fez, Morocco, March 2-4, 2007.
60. Cirugía de los tumores T4. *Congreso de la Société Marocaine des Maladies Respiratoires*. Fez, Morocco, March 2-4, 2007.
61. Rare tumors: Chest wall tumors. *ESMO International Symposium (EIS) of Chest Tumors*. Geneva, Switzerland, March 30 – April 1, 2007.
62. Cirugía de los tumores de pancoast. Mesa de Cirugía I: Recursos Técnicos en Cirugía Torácica. *Congreso Sociedad Madrileña de Neumología y Cirugía Torácica*. Madrid, Spain. April 12-13, 2007.
63. Resección de la carina traqueal: planteamiento teórico. *Curso de Actualización en Técnicas Quirúrgicas Torácicas*. Salamanca, Spain, May 29-30, 2007.
64. Resección y reconstrucción de la vena cava superior. Enfermedad Vasculat Pulmonar. *Curso FMC-SEPAR*. Castelldefels, Spain. October 5-6, 2007.
65. Resección de Carina. *Programa Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia. October 11-14, 2007.
66. Avances en cirugía de tráquea. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia. October 11-14, 2007.
67. Implante de vasos cadavéricos en cirugía de tórax. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia, October 11-14, 2007.

68. Tratamiento quirúrgico del htp por TEP recurrente. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerología. Medellín, Colombia. October 11-14, 2007.*
69. Novalung: Asistencia pulmonar. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerología. Medellín, Colombia. October 11-14, 2007.*
70. Manejo quirúrgico de las estenosis subglóticas benignas y malignas en niños y adultos. *XXIX Curso Internacional de la SMORL y CCC (Sociedad Mexicana de Otorrinolaringología y Cirugía de la Cabeza y Cuello). México D.F., México. February 14-16, 2008.*
71. Traqueotomía mediastinal, indicaciones y técnica quirúrgica. *XXIX Curso Internacional de la SMORL y CCC (Sociedad Mexicana de Otorrinolaringología y Cirugía de la Cabeza y Cuello). Ciudad de México, México. February 14-16, 2008.*
72. Conferencia Magistral: Estado actual y futuro del tratamiento de la estenosis laringotraqueal (Transplante, biología molecular, inmunología e ingeniería de tejidos de la vía aérea). *XXIX Curso Internacional de la SMORL y CCC (Sociedad Mexicana de Otorrinolaringología y Cirugía de la Cabeza y Cuello). México D.F., México. February 14-16, 2008.*
73. Conferencia Inagural: Asistencia Ventilatoria Extracoporal. *Ier Seminario Cuidados Respiratorios. Ciudad Real, Spain. February 27-29, 2008.*
74. The technological improvements in Thoracic Surgery practice. *11th Annual Congress of the Turkish Thoracic Society. Belek-Antalya, Turkey. April 23-27, 2008.*
75. Carina involvement and the management of satellite nodule. *11th Annual Congress of the Turkish Thoracic Society. Belek-Antalya, Turkey. April 23-27, 2008.*
76. Traumatismos torácicos. Módulo de Atención al Paciente Politraumatizado Grave. *Master Críticos. Universidad de Barcelona. Barcelona, Spain. May 21, 2008.*
77. Presentación teórica: Cómo lo hago. Abordaje transpericárdico de la carina traqueal. *II Curso Avanzado de Cirugía Torácica. Hospital Universitario de Salamanca. Salamanca, Spain. June 16-18, 2008.*
78. Sistema de intercambio de gases extracorporales. *Módulo de Patología de Alta complejidad. Master de Medicina Respiratoria. Universidad de Barcelona. Sede de la Sociedad Española de Neumología y Cirugía Torácica (SEPAR), Barcelona, Spain. June 21, 2008.*
79. Soporte respiratorio extra-corporal. *XV Curso de actualización en cuidados intensivos respiratorios para enfermería. Hospital Clínic - Universidad de Barcelona. Barcelona, Spain. October 13-17, 2008.*

80. Soporte extracorporeo para la insuficiencia respiratoria aguda. *VI Simposio Asociación Colombiana de Medicina Crítica y Cuidado Intensivo*. Santiago de Cali, Colombia. November 6-8, 2008.
81. Soporte extracorporeo como puente al trasplante pulmonar. *VI Simposio Asociación Colombiana de Medicina Crítica y Cuidado Intensivo*. Santiago de Cali, Colombia. November 6-8, 2008.
82. Tissue engineering in Chirurgia Toracica: quo vadis. II Sessione Nuove Tecnologie in Endoscoia e Chirurgia Toracica. *Congresso Nuove Tecniche e Nuove Tecnologie in Patologia Toracica*. Barletta, Italy. December 5-6, 2008.
83. Thoraxchirurgie. *Stadienadaptierte Standards in der Thoraxchirurgie. Hannover Meeting*, Hannover, Germany. January 16-17, 2009.
84. Bionic Airways Surgery. *The Royal Society of Medicine*. London, UK. January 21, 2009.
85. Transplantament pulmó. *Master Transplantament d'Organs*. Universitat de Barcelona, Facultad de Medicina, Barcelona, Spain. February 9, 2009.
86. Patología de la tráquea. *V Symposium Internacional "Neumología Siglo XXI"*. Madrid, Spain. February 26, 2009.
87. ¿Qué ha cambiado en cirugía torácica? Células madre y pulmón: la experiencia de la tráquea. *Congreso Neumotoxa*. La Toja, Vigo, Spain. February 26-28, 2009.
88. Tracheo-bronchial transplantation. ESTS – *European Society of Thoracic Surgeons*. Elancourt, Paris, France. March 2-3, 2009.
89. Airway Transplantation. *Transplant Services Foundation (TSF)*, Barcelona, Spain. March 11, 2009.
90. Lessons learned from the first completely tissue engineered organ (the windpipe). *4th World Congress on Regenerative Medicine*. Bangkok, Thailand. March 12-14, 2009.
91. Il futuro dei trapianti clinici con tessuti ingegnerizzati. *8^o Corso di formazione avanzata. Medicina Rigenerativa cellulare: realtà e prospettive*. Collegio Ghislieri, Pavia, Italy. March 20, 2009.
92. Artificial lung: quo vadis? *5th Scientific Meeting: Assist Devices-Bridge to Life*. Eugenides Foundation, Athens, Greece. March 21, 2009.
93. Tissue engineered tracheal transplantation and cell restoration: techniques, indications, and perspectives. *5th Scientific Meeting: Assist Devices-Bridge to Life*. Eugenides Foundation, Athens, Greece). March 21, 2009.
94. Tissue engineered cell restoration and replacement. *I Setmana de la Recerca*, Facultad de Medicina, Universitat de Barcelona, Barcelona, Spain. March 25, 2009.

95. Tra cardiocirurgia e Chirurgia toracica: i tumori con infiltrazione di cuore o vasi. Chi operare, come pianificare l'intervento, come operare. *Complicanze cardiovascolari in oncologia: ieri ed oggi. La gestione delle problematiche.* Napoli, Italy. March 26, 2009.
96. Bioengineering organs and tissues cell restoration. *Committee for Advance Therapies (CAT).* European Medical Agency. London (UK), 16 April, 2009.
97. Future of Regenerative Medicine. *VI Reunión Nacional de Coordinadores de Trasplantes.* Zaragoza, Spain. April 17, 2009.
98. Tissue and cell engineering. *Annual Meeting of INFARMED Ministry of Health (Medicamentos e productos de saude: Inovacao, acessibilidade e sustentabilidade).* Lisbo, Portugal. May 15, 2009.
99. Pulmonary Hypertension. *40th Annual congress of the Italian Association of Nonacademic Cardiologist.* Firenze, Italy. June 4-7, 2009.
100. From Bench to bedside. *The NHS Healthcare Innovation Expo.* London, UK. June 18, 2009.
101. Airway surgery. *Convegno nazionale di pneumologia interventzionistica.* Firenze, Italy, June 19, 2009.
102. Role and fate of autologous cells in whole tissue-engineered airway replacement. *International Society for Stem Cell Reserach (ISSRS) 7th Annual Meeting,* Barcelona, Spain. July 10, 2009.
103. Translating tissue engineering into clinical transplantation: time has come. *14th Congress of the European Society Organ Transplantation,* Paris, France. August 30, 2009.
104. Putting life to science. *The knowledge triangle shaping the future of Europe.* Gothenburg, Sweden. September 1, 2009.
105. Bench to Bedside: Stem Cells Transplantation. *2nd annual Stem Cells & Regenerative Medicine Europe conference.* Edinburgh, Sweden. September 25, 2009.
106. Transplante de trachea. *XVII Congreso de la Asociacion Iberoamericana de Cirurgia Toracica.* Seville, Spain. October 1, 2009.
107. Tissue engineering as alternative to improve transplants outcome. *V Congresso de la Sociedad de Terapia genica y celular.* Granada, Spain. October 2, 2009.
108. Stem cell restoration and replacement of the airway and lungs. *Focus on Cell Therapy, Transplantation and Tissue Repair.* Bergamo, Italy, October 10, 2009.
109. Tissue engineering cell restoration and replacement. *Conference of the EACTS on advanced therapies in general thoracic surgery.* Vienna, Austria. October 21, 2009.
110. Airway tissue engineering. *World Conference in Regenerative Medicine.* Leipzig, Germany. October 30, 2009.

111. Medicina Regenerativa en Vías Respiratorias. *1st Symposium on Translational Regenerative Medicine*. Vitoria, Spain., October 31, 2009.
112. Airways and lung tissue engineering and cell repair. *19th Congress of the World Society of Cardio-Thoracic Surgeons (WSCTS)*. Buenos Aires, Argentina, November 4-6, 2009.
113. Advances in airway surgery. *19th Congress of the World Society of Cardio-Thoracic Surgeons (WSCTS)*. Buenos Aires, Argentina. November 4-6, 2009.
114. Surgery for advanced lung cancer. *19th Congress of the World Society of Cardio-Thoracic Surgeons (WSCTS)*. Buenos Aires, Argentina. November 4-6, 2009.
115. Beyond translational regenerative medicine. *Karolinska Institutet*. Stockholm, Sweden, November 12, 2009.
116. Bionic tissue engineering. *2nd Annual Commercial Translation of Regenerative Medicine*. London, UK. December 3-4, 2009.
117. Bionic airway engineering and lung restoration. *First International Conference in Regenerative Surgery*. Rome, Italy, December 10, 2009.
118. Advanced surgery for locally advanced non-small cell lung cancer. *Update NSCLC*. Hannover, Germany. December 12, 2009.
119. Progress and Perspectives in Regenerative Medicine. *University of Modena*. Modena, Italy. January 13, 2010.
120. Progress in airway surgery. *46th Annual Meeting of the Society of Thoracic Surgeon (Techno-College Post-graduate course)*. Fort Lauderdale, Florida, US. January 23, 2010.
121. Regenerative Medicine-principles and tasks. *Russian Royal Academy of Science*, Moscow, Russia. February 19, 2010.
122. Novel Approaches to Whole Organ Tissue Engineering. *Nanomedicine: Visions for the Future*, Amsterdam, Netherlands. February 25, 2010.
123. Tracheobronchial transplantation. *Turkish Society of Pneumology and Thoracic Surgery*, Uludag (T), 14-16 March 2010.
124. The artificial lung. *Turkish Society of Pneumology and Thoracic Surgery*, Uludag, Turkey. March 14-16, 2010.
125. Tracheal Reconstruction with Tissue Engineered Airway. *90th Annual Meeting of the American Association of Thoracic Surgery (Postgraduate Course)* Toronto, Ontario, Canada. May 1-5, 2010.
126. How to translate the science to a viable medical treatment. *World stem cells and Regenerative Medicine Congress*. London, UK. May 11-13, 2010.

127. Indications and therapy of primary malignant cardiac tumors. *5th Annual Meeting of the Italian Society of Cardiology and Clinical Echography*. Ancona, Italy, May 7, 2010.
128. Clinical tissue engineering: the 1st adult stem cell grown trachea transplant. *5th International Annual Meeting of Portuguese Society for Stem Cells and Cellular Therapies (SPCE-TC)*, AvePark, Taipas-Guimarães, Portugal. May 20-21, 2010.
129. Whole organ tissue engineering transplantation. *International Society of Cell Therapy*, Philadelphia, Pennsylvania, US. May 24-26, 2010.
130. T4 NSCLC Invading the Great Vessels and Heart. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts. May 27-28, 2010.
131. Carinal resection for NSCLC. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts, US. May 27-28, 2010.
132. Current status of the artificial lung. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts., US. May 27-28, 2010.
133. Management of Benign Tracheoesophageal Fistula. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts, US. May 27-28, 2010.
134. Oncologia Toracica; Cancro polmonare non a piccole cellule. Tecniche innovative nella resezione carenale. *Associazione Italiana Pneumologi Ospedalieri*. Florence, Italy. June 11-12, 2010.
135. Pediatric airway tissue engineering. *Royal Academy of Medicine*. London, UK. July 11, 2010.
136. Regenerative airway replacement. *Russian Academy of Science*. Moscow, Russia. July 21, 2010.
137. Differences between in vitro and in vivo stem cell characterization and activation for windpipe transplantation. *Seoul Symposium on Stem Cell Research*. Seoul, South Korea. August 25, 2010.
138. Stem Cell Symposium. Airway tissue engineering. *5th young European scientist meeting*. Porto, Portugal. September 24-26, 2010.
139. Airway Tissue Engineered Replacement and Cell Therapy. *5th World Congress on Preventive & Regenerative Medecine*. Hannover, Germany. October 5-7, 2010.
140. Bioengineering the airway. *University California Davis*, Sacramento, California, US. October 13, 2010.
141. Progres en ingenierie bio-tissulaire du remplacement des voies aeriennes et therapie cellulaire. *Academie Nationale de Medicine*. Paris, France. October 26, 2010.
142. Airway Transplantation. *University of Bursa*, Bursa, Turkey. November 5, 2010.
143. Surgical strategies and results in the era of the multidisciplinary approach. *XXV National Congress Italian Society for Cardiac Surgery*. Rome, Italy. November 6-9, 2010.

144. Whole-organ stem cell transplantation of the larynx. *Association for Research in Otolaryngology*. Baltimore, Maryland, US. February 22, 2011.
145. Advances in regenerative airway cell therapy and tissue engineering. *Faculty of Medicine*. Krasnodar, Russia. February 25, 2011.
146. Tissue Engineered Airway Replacement and Cell Therapy. *6th John Vane Memorial Symposium on Prostacyclin Science and Pulmonary Vascular Disease*. London, UK. March 26, 2011.
147. Decellularised Lungs. *3rd Lung Regeneration Workshop, United Kingdom National Stem Cell Network*. York, UK. March 31, 2011.
148. Research design and preparing grant proposal in thoracic surgery. *6th National Thoracic Surgery Congress*. Antalya, Turkey. April 30, 2011.
149. Tracheal Transplantation. *6th National Thoracic Surgery Congress*. Antalya, Turkey. April 30, 2011.
150. Reprogramming cells for regenerative medicine. *European Science Foundation Exploratory Workshop on Developmental Origins of Chronic Lung Disease*. Feldafing, Germany. May 1, 2011.
151. Tissue engineered trachea for in vivo implantation. *American Thoracic Society International Conference*. Denver, Colorado, US. May 16, 2011.
152. Stem-cell based restoration and replacement therapies for irreversible diseases of the airway. *American Society Gene and Cell Therapy, 14th Annual Meeting*. Seattle, Washington, US. May 18, 2011.
153. Advances in airway surgery. *University of Vermont*. Burlington, Vermont, US. July 25, 2011.
154. Cell Therapy and Bioengineered Replacement of the Airways. *Stem Cells and Cell Therapies in Lung Biology and Lung Diseases*. Burlington, Vermont, US. July 27, 2011.
155. Trachea and oesophagus tissue engineering. *5th SENS Conference on Rejuvenation biotechnologies*. Cambridge, UK. September 2, 2011.
156. Airways regeneration and cell therapy. *1st Congress on Stem Cell Research*. Istanbul, Turkey. September 28, 2011.
157. Advances in airway surgery. *2011 Clifton F. Mountain distinguished lecturer thoracic & cardiovascular surgery*. MD Anderson. Houston, Texas, US. November 1, 2011.
158. Tracheal transplantation by cell and tissue engineering. *Carl –Gistav Groth Annual Lecture*, Solna Sweden. November 10, 2011.
159. Lessons learned from airway tissue engineering transplantation. Astana, Kazagstan. November 12, 2011.

160. The possibilities and advances of regenerative medicine. Experience and the future. *Russian Academy of Science*. Moscow, Russia, November 28, 2011.
161. The first human tracheobronchial transplantation using a stem cell-seeded bioartificial nanocomposite. *Scandinavian Society for Research in Cardiovascular Surgery 22nd Annual Meeting*. Geilo, Norway. February 9, 2012.
162. The First Stem-Cell Tracheal Transplant. *National Undergraduate & Foundation General Surgery Conference*. University College London, London, UK. March 4, 2012.
163. From stem cells to artificial organs. *2nd Technological Innovation Conference and Expo*. Mexico City, Mexico. March 21, 2012.
164. Tracheal-Bronchial Replacement Therapy with Stem Cells: Universal Application? *American Association for Thoracic Surgery*. San Francisco, California, US. April 29, 2012.
165. Clinical Experience with Airway Tissue Replacement. *Biologic Scaffolds for Regenerative Medicine, 7th Symposium*. Napa Valley, California, US. April 27, 2012.
166. Regenerative biotechnological treatment of life-threatening diseases of the airways. *European student conference*. Berlin, Germany. August 31, 2012.
167. Stem-cell based organ replacement and cell therapy. *World Stem Cell Summit*, West Palm Beach, Florida, US. December 3, 2012.
168. Regenerative Biotechnological Treatment. *American Association of Advance in Science*, Boston, Massachusetts, US. February 18, 2013.
169. Tracheal and Carinal Tumors: Management and Outcome. Surgery of the trachea from resection to transplantation. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 21, 2013.
170. Mediastinal Tracheostomy. Surgery of the trachea from resection to transplantation. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 21, 2013.
171. Surgery for subglottic stenosis. Surgery of the trachea from resection to transplantation. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 21, 2013.
172. Biotransplantation of the trachea. Saudi Group of Thoracic Surgery and Saudi Thoracic Society. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 22, 2013.
173. Stem Cell Therapy for Necrotic Upper Airway. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 22, 2013.

174. Stem Cell Identification of Tracheal Carcinoma. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 22, 2013.
175. Regenerative medicine: implications for transplantation and cancer therapy. *Surgical Grand Round, University of Illinois College of Medicine at Peoria Department of Surgery*. Peoria, Illinois, US. April 5, 2013.
176. Stem cell treatment in ARDS. *2nd EuroELSO Congress*. Stockholm, Sweden. May 9, 2013.
177. Transplantable Scaffolds For The Lung. *American Thoracic Society*, Philadelphia, Pennsylvania, US. May 17-22, 2013.
178. Interaction Between Mesenchymal Stromal Cells, Bioengineered Tissues and Organs & Human body. *International Society for Stem Cell Research*, Florence, Italy, September 17, 2013.
179. Cell-Scaffold Interactions in Clinical Tissue Engineering Transplantation. *3rd Cell Society*, San Diego, California, US. September 19, 2013.
180. From research to clinical application using stem cells. *Medicinteknikdagarna (MTD)*, Stockholm, Sweden. October 2, 2013.
181. Clinical cell-matrix Interactions. *World Conference of Regenerative Medicine*. Leipzig, Germany. October 24, 2013.
182. Update on bioengineering organs and cell therapy. *Open Innovation Forum*. Moscow, Russia. November 1, 2013
183. Invited Speaker. Lost in Translation- Clinical Developments. *4th Berlin-Brandenburg School for Regenerative Therapies PhD Symposium*. Berlin, Germany. December 6, 2013.
184. Regenerative Medicine. *University of Illinois at Urbana-Champaign, Department of Surgery*. Urbana, Illinois, US. December, 23, 2013.
185. Progress in Clinical Thoracic Tissue Engineering and Cell Therapy. *Texas Heart Institute*, Houston, Texas, US. January 9, 2014.
186. Current State of Regenerative Medicine. *University of Illinois at Urbana-Champaign, College of Bioengineering*. February 12, 2014.
187. Current State of Regenerative Medicine. *International Stem Cell Society*. Freeport, Bahamas. February 20, 2014.
188. Clinical applications for Tissue Engineered Intrathoracic Organs. *Third International Genetics of Aging and Longevity Conference*, Moscow Russia, April 9, 2014.
189. The development of tissue engineered organs. *X International Symposium of Biomedical Engineering*. Monterey City, Mexico, April 24, 2014.

190. Innovations in airway surgery: tracheal replacement and beyond *American Association for Thoracic Surgery*, Toronto, Ontario, Canada, April 26, 2014.

191. Medical Innovation. *International conference on intellectual property and health innovation. Challenges for the future. World Intellectual Property Organization*. Athens, Greece, April 28, 2014.

3.2 Oral presentations of own accepted abstracts

Not applicable

4 RESEARCH FUNDING OBTAINED IN THE PAST FIVE YEARS

4.1 External research funding obtained in international or national competition as principal applicant

As project leader in the past 5 years: (total financial support internationally and locally 11,550,701 €):

1. Feasibility Study of a novel vascular access mode for artificial lung. Releasing authority: Novalung GmbH, Freiburg. Period: 2006-2010: Total contribution: 110,000 €.
2. Caracterización celular y extracelular de la disfunción endotelial en la hipertensión pulmonar crónica post-embólica. Releasing authority: MAPFRE de Investigación. Period 2006-2010: Total contribution: 13,200 €.
3. Feasibility Study of a novel treatment for postpneumonectomy ARDS. Releasing authority: Novalung GmbH, Freiburg. Period: 2006-2010: Total contribution: 45,000 €.
4. Sistema de soporte respiratorio extracorpóreo sin bomba. Releasing authority: Agència d'Avaluació de Tecnologia Mèdica, Ministerio de Sanidad/ISCIII. Spain. Period: 2007-2008: Total contribution: 282,910 €.
5. Airway tissue engineering. Releasing authority: Ministry of Health, Tuscany. Period: 2010-2012: Total contribution: 500,000 €.
6. BIOtrachea (No. 280584-2). Releasing authority: Biomaterials for Tracheal Replacement in Age-related Cancer via a Humanly Engineered Airway. FP7-NMP-2011-SMALL-5, European Project. Period: 2012-2017: Total contribution: 3,993,300 €.
7. Regeneration of Airways and Lungs. (No. 11.G34.31.0065) Releasing Authority: Government of the Russian Federation. Period: 2011-2013: Total Contribution: 4,446,070 €.
8. (Renewal) Regeneration of Airways and Lungs. (No. 11.G34.31.0065) Releasing Authority: Government of the Russian Federation. Period: 2013-2015: Total Contribution: 480,833 €.
9. Bioengineering of lung tissue and whole lung using autologous stem cells and natural scaffolds. Hjärt-Lungfonden, (No. 20110621). Period: 2011-2013: Total contribution: 102,359 €.

10. Bioengineering of the aortic valve and aortic root with autologous stem cells for clinical application. Hjärt-Lungfonden, (No. 20130748). Period: 2014-2015: Total contribution: 115,000 €.
11. Biotekniskt framställt hjärta – en alternativ metod till allogen hjärtrtransplantation. Swedish Research Council Vetenskapsrådet (No. K2012-65X-22037-01-3). Period: 2012-2014: Total contribution: 204,738 €.
12. Utveckling av odlad naturlig och bioartificell matstrupe. Swedish Research Council Vetenskapsrådet, (No. K2012-99X-22333-01-5). Period: 2012-2016. Total contribution: 1,137,472 €.
13. Transplantation of bioengineered trachea in humans. ALF medicine 2012, (Dnr LS 1101-0042). Period: 2012: Total contribution: 54,467.27 €.
14. Development and clinical application of tissue engineered natural and bioartificial esophageal scaffolds. ALF medicine 2013, (Dnr LS 1112-1587). Period: 2013-2014. Total contribution: 65,351.38 €.

4.2 External research funding obtained in international or national competition as co-applicant

As joint applicant in the past 5 years: (total financial support internationally and locally 1,968.218 €):

1. Title: Education, research and training in regenerative airway medicine. Releasing authority: Krasnodar Regional Association of Transplantology and Regenerative Medicine and Charity Foundation for Support of Scientific Researches "Science for Life Extension" (Russian Federation). Period: 2009-2012. Total contribution: 450,000 €.
2. Title: RegenVOX. Stem-cell based, tissue engineered laryngeal replacement. Releasing authority: Medical Research Grant on translational stem cell grant. Period: 2011-2013. Total Contribution: 1,108,899 €.
3. Strategic Research Programme in Stem Cells and Regenerative Medicine ([StratRegen](#)). Period: 2012: Total Contribution: 409,319 €.

4.3 Significant other research funding received (donation, grant in local competition – e.g. ALF project) as principal applicant

As project leader in the past 5 years: (total financial support locally 1,616,193.65 €)

1. Bioengineering of lung tissue and whole lung using autologous stem cells and natural scaffolds. Hjärt-Lungfonden, (No. 20110621). Period: 2011-2013: Total contribution: 102,359 €.
2. Bioengineering of the aortic valve and aortic root with autologous stem cells for clinical application. Hjärt-Lungfonden, (No. 20130748). Period: 2014-2015: Total contribution: 115,000 €.
3. Biotekniskt framställt hjärta – en alternativ metod till allogen hjärtrtransplantation. Swedish Research Council Vetenskapsrådet (No. K2012-65X-22037-01-3). Period: 2012-2014: Total contribution: 195,104 €.
4. Utveckling av odlad naturlig och bioartificell matstrupe. Swedish Research Council Vetenskapsrådet, (No. K2012-99X-22333-01-5). Period: 2012-2016. Total contribution: 1,083,912 €.

5. ALF medicine 2012, Transplantation of bioengineered trachea in humans (Dnr LS 1101-0042). Period: 2012: Total contribution: 54,467.27 €.
6. ALF medicine 2013, Development and clinical application of tissue engineered natural and bioartificial esophageal scaffolds (Dnr LS 1112-1587). Period: 2013-2014. Total contribution: 65,351.38 €.

4.4 Significant other research funding received (donation, grant in local competition – e.g. ALF project) as co-applicant

As joint applicant in the past 5 years: (total financial support locally 953,355.28€):

1. Knut and Alice Wallenberg Foundation for Wallenberg Institute for Regenerative Medicine. Period: 2012: Total contribution: 136,463 €.
2. Klinisk tillämpning av biokonstruerade organ med särskild betong på trachea. Swedish Research Council Vetenskapsrådet (No. K2013-99X-22252-01-5). Period: 2013-2017: Total contribution: 816,892.28 €.

5 SCIENTIFIC COLLABORATIONS

University, Burlington (USA)	Prof. Daniel Weiss
Harvard, Bioscience Inc. (USA)	
Yale University, New Haven (USA)	Prof. Laura E. Niklason
Tulane University, New Orleans (USA)	Prof. Bruce Bunnell
Children's Hospital of Illinois, Illinois (USA) · Adelaide University (Australia)	Prof. Mark Holterman Dr. Ivan Vassiliev
Republic Polytechnic (Singapore)	Dr. Brandon N.S. Ooi
Università degli Studi di Modena e Reggio Emilia (Italy)	Prof Graziella Pellegrini
Consiglio Nazionale Ricerche (Italy)	Dr. Loredana de Bartolo
Interuniversity consortium for Materials Science and Technology (Italy)	Dr. Alessandra Bianco
Università degli Studi di Milano (Italy)	Prof. Fulvio Gandolfi Prof. Tiziana A. L. Brevini
Robert Koch Institute (Germany)	Dr. Herald Lange
Medical School, Hannover (Germany)	Prof. Denise Hilfiker-Kleine
Universitätsklinikum Aachen, (Germany)	Prof. Tom Luedde

University, Leipzig (Germany)	Prof. Augustinus Bader
Hugo-Sachs Elektronik (Germany)	
University of Kiel (Germany)	Dr. Mark Lüdde
Martin Luther University Halle-Wittenberg (Germany)	Prof. Heike Kielstein
Universitätsmedizin Mannheim (Germany)	Dr. Jost von Hardenberg
Institut Gustave Roussy (France)	Prof. Eric Deutsch
San Pau Barcelona (Spain)	Dr. Oriol Sibila
University of Sheffield, Sheffield (GB)	Dr. Christian Unger
University College London, London (GB)	Prof Chris Mason
Imperial College of Science, Technology and Medicine, London (GB)	Prof. Sara Rankin Prof. Sakis A. Mantalaris Prof. Dame Julia Polak
Pharmidex Pharmaceutical Services Limited, London (GB)	Dr. Mo Alavijeh
Intercytex Ltd., London (GB)	Dr. Paul Kemp
Kuban State University, Krasnodar (Russia)	

6 SUPERVISION OF GRADUATE STUDENTS

6.1 PhD candidates supervised up to the defence of the candidate's doctoral thesis, with the applicant serving as *main supervisor*

- Verhoye Jean-Philippe: *Tracheo-esophageal complications from mechanical ventilation*. Université de Rennes I (Rennes, France), 1998
- Shukri, Tamara. Title: *Identification des antigènes responsable du rejet hyperaigue dans un modèle de xenotransplantation pulmonaire orthotopique cochon-chèvre*. Université d'Angers (Angers, France) 1998
- Gruhn, Silke. Title: *Role der apnoische oxygenierung in der Trachealchirurgie*. Medizinische Hochschule Hannover (Germany), 2003
- Karsten Kuhn. Title: *Evaluierung der transkardiopulmonalen Einzelindikator-Thermodilution nach Lungenresektionen wegen nichtkleinzelligem Bronchialkarzinom unter besonderer Berücksichtigung der Lymphadenektomie*. Medizinische Hochschule Hannover (Germany), 2005.

- Christian Biancosino. Title: *Generation of a bioartificial fibromuscular tissue with autoregenerative capacities for surgical reconstruction*. Medizinische Hochschule Hannover (Germany), 2006.
- Eike Nicke and Lars-Oliver Jasper. Title: *Perioperative Antibiotikaprophylaxe in der elektiven Lungenchirurgie: prospektive Anwendungsbeobachtung mit "single-shot" Rocephin und retrospektive Kontrollanalyse zweier prolongierter Prophylaxe-Regime mit Augmentan und Unacid; klinische Wirksamkeit und Kosteneffizienz*. Medizinische Hochschule Hannover (Germany), 2008.
- Nina Städtler. Title: *Prospektive Analyse der Ösophagusfunktion nach Pneumonektomie*. Medizinische Hochschule Hannover (Germany), 2010.
- Philipp Jungebluth. Title: *A potential approach for tracheal reconstruction: biotissue engineering of a tracheal tubular graft*. Medizinische Hochschule Hannover (Germany), 2010.
- Leonardo Polizzi. Title: *Development of an animal model for bioengineered tracheal graft evaluation*. Faculty of Medicine at the University of Florence (Italy), 2012.
- Johannes Haag. Title: *Improved biomechanics of tracheal natural scaffolds using cross-linking proteins*. Medizinische Hochschule Hannover (Germany), 2012.
- Jafar Jorjani. Title: *Interrelation between intensive care patients and general thoracic surgery*. Medizinische Hochschule Hannover (Germany), 2012.

6.2 PhD candidates supervised up to the defence of the candidate's doctoral thesis, with the applicant serving as co-supervisor

None

6.3 Students supervised up to their licentiate degree, with the applicant serving as main supervisor

As supervisor or (academic and hospital) program director:

University of Pisa (Pisa, Italy)

- 1988: Ruschi, Stefano. Title: *Pulmonary function and bullous emphysema*. Diploma in Pneumology. Published in: *Minerva Pneumol* 1990; 29:9-18.
- 1989: Ricagna, Fabio. Title: *Functional results of sleeve lobectomy*. Diploma in General Surgery. Published in: *Eur J Cardio-Thorac Surg* 1991; 5:410-3.
- 1990: Pieri, Marco. Title: *Most peripheral non small lung cancers have low proliferative rates and no intra- or peritumoral vessel invasion*. Thesis in medicine and surgery. Published in: *J Thorac Cardiovasc Surg* 1992; 104:892-9.

University of Alabama at Birmingham (Alabama, USA)

- 1991: Hsu, Chuanchieh. Title: *Invasion of blood vessels by tumor cells predicts recurrence of bronchogenic cancers*. Diploma in biomedical statistics. Published in: *J Thoracic Cardiovasc Surg*, 1993; 106:80-9.

Université de Franche-Comté, (Besançon, France)

- 1995: Murakami, Shinia. Title: *Prevention of reperfusion injury by inhaled nitric oxide in lungs harvested from non-heart-beating donors*. DEA in Transplantation d'Organe et Greffe de Tissu. Published in: *Ann Thorac Surg* 1996; 62:1632-8.
- 1996: Bacha, Emile. Title: *Inhaled nitric oxide attenuates reperfusion injury in non-heart beating donor lung transplantation*. DEA in Transplantation d'Organe et Greffe de Tissu. Published in:

Transplantation 1997; 63:1380-6.

- 1997: Guerra, Nadia. Title: *Polymerase chain reaction analysis of nude mice generated human tracheas transplanted in piglets*. DEA in Transplantation d'Organe et Greffe de Tissu. Published in: *Transplantation* 2000; 70: 1555-9.

Université d'Angers (Angers, France)

- 1998: Shukri, Tamara. Title: *Identification des antigènes responsable du rejet hyperaigue dans un modèle de xenotransplantation pulmonaire orthotopique cochon-chèvre*. Diploma in Cellular Biology.

Université de Rennes I (Rennes, France)

- 1998: Verhoye Jean-Philippe: *Tracheo-esophageal complications from mechanical ventilation*. Thesis in Medicine et Chirurgie. Published in: *J Thorac Cardiovasc Surg* 200; 121: 68-76.

Medizinische Hochschule Hannover, Hannover, Germany

- 2003: Breitbach, Sven. Title: *Adenovirale Vektoren - PCR- gestütztes Screening zur Korrelation von Adenoviren und intrathorakalen Malignomen*. Thesis in medicine and surgery.
- 2006: Biancosino, Christian. Title: *Generation of a bioartificial fibromuscular tissue with autoregenerative capacities for surgical reconstruction*. Thesis in medicine and surgery. Published in: *Cytotherapy* 2006;8(2):178-83.

6.4 Students supervised up to their licentiate degree, with the applicant serving as co-supervisor

None

6.5 Ongoing supervision of a PhD candidate, with the applicant serving as main supervisor

- Sebastian Sjöqvist. Title: *Tissue engineering and stem cell therapy for esophageal disorders*. Clinical Scientist Training Programme (CSTP) Karolinska Institutet. Stockholm, Sweden Expected in 2015.
- Ylva Gustafsson. Title: *Mesenchymal stromal cell therapy in rat models of pulmonary hypertension*. Clinical Scientist Training Programme (CSTP) Karolinska Institutet. Stockholm, Sweden Expected in 2017.
- Elena Kuevda. Title: *Decellularization and recellularization of rat lung*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical University. Krasnodar, Russia Expected in 2014.
- Alexander Sotnichenko. Title: *Decellularization and recellularization of rat heart*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical University. Krasnodar, Russia. Expected in 2016.
- Irina Gilevich. Title: *Translation effects of bioactive molecules on tracheal regeneration*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical University. Krasnodar, Russia. Expected in 2016.
- Alina Popova. Title: *Pathophysiological aspects of chondrogenesis in the culture of multipotent mesenchymal stromal cells*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical University. Krasnodar, Russia. Expected in 2015.
- Linda Helen Freidrich. Title: *Preservation of aortic root architecture and properties using a detergent-enzymatic perfusion protocol*. Medizinische

- Hochschule Hannover, Germany, Expected in 2014.
- Annika Stuver *Tissue engineering of the intestine*. Medizinische Hochschule Hannover, Germany, Expected in 2016.
- Natalie Keune. Title: *Immunological responses of cell-to-matrix interactions of tracheal scaffolds*, Friedrich Schiller University Jena, Jena, Germany, Expected in 2016.

6.6 Ongoing supervision of a PhD candidate, with the applicant serving as co-supervisor

None

6.7 Postdoc supervision

- Dr. Manoli Iglesias. Title: *Experimental and clinical extracorporeal mechanical ventilation in refractory acute distress respiratory syndrome*. University of Barcelona. (Spain) (Jun 2012).
- Dr. David Sanchez. Title: *Pre-clinical efficacy of a novel extracorporeal ventilation device*. University of Barcelona. (Spain) (Jun 2012).
- Dr. Alberto Rodriguez. Title: *Cellular and molecular endothelial dysfunction in chronic pulmonary embolism*. University of Barcelona. (Spain) (June 2012).
- Dr. Fatemeh Ajalloueian. Title: *Tissue engineering of artificial scaffolds*. Karolinska Institutet. (Sweden) (Dec 2013)
- Dr. Jungebluth Philipp. Title: *Regenerative approaches to end-stage diseases of the airways*. (Medizinische Hochschule Hannover (Germany)). (Nov. 2013).
- Dr. Mei Ling Lim. Title: *Stem cell therapy for diseases to the respiratory tract*. Karolinska Institutet. (Sweden) (to be presented)
- Dr. Elena Gubareva. Title: *Decellularization and recellularization of rat diaphragm*. Kuban State Medical University, Krasnodar (Russia) (to be presented)

6.8 Supervision of other researchers who have defended a thesis

- Dr. Fatemeh Ajalloueian. Title: *Tissue engineering of artificial scaffolds*. Karolinska Institutet. (Sweden) (Dec 2013)
- Dr. Greg Lemon. Title: *Mathematical modeling of whole organs for regeneration*. Karolinska Institutet. (Sweden) (to be presented)
- Dr. Mei Ling Lim. Title: *Stem cell therapy for diseases to the respiratory tract*. Karolinska Institutet. (Sweden) (to be presented)
- Dr. Elena Gubareva. Title: *Decellularization and recellularization of rat diaphragm*. Kuban State Medical University, Krasnodar (Russia) (to be presented)

6.9 Ongoing careers of holders of earlier PhDs and of postdocs

Not applicable

7 THESIS EVALUATION

7.1 Serving as thesis opponent

Not applicable

7.2 Serving as a member of a thesis examination committee

In all of my listed PhD students

7.3 External thesis reviewer

Jean Philippe Verrohye. Title: Surgical management of tracheal diseases. Rennes University (France). 1997

8 EVALUATION OF OTHERS' WORK

8.1 Serving as reviewer of candidates proposed for academic positions

- Mr. Tobias Welte: Hannover Medical School (Germany). 2003: Appointment as C4 (Full Professorship) Professor
- Mr. Jean Philippe Verrohye: Rennes University (France). 2007: Appointment to PHU (Professeur Universitaire Hospitalier).
- Mr. Martin Birchall: University College London (Germany). 2009: Appointment as Full Professor of Laryngology.
- Mr. Augustinus Bader: Belfast University (Ireland). 2010: Appointment as Chair of Regenerative Medicine and Professor of Regenerative Medicine.
- Mr. Fabrizio Follis: University of New Mexico (USA). 2010: Appointment as Chair of Cardiac Surgery and Full Professor of Cardiac Surgery.
- Mr. Daniel Weiss: University of Vermont (USA). 2011: Appointment as Full Professor.

8.2 Serving as reviewer for international evaluations

- Chairman, Research and Research Funding, European Association Cardio thoracic Surgery, EACTS
- Scientific Council on Pulmonary Transplantation, International Society of Heart Lung Transplantation
- European Union Liaison, EACTS
- Post-graduate Education, EACTS
- Young Investigator Awards, EACTS
- Surgical Treatment of End-Stage, Cardiopulmonary Disease Committee, Society of Thoracic Surgeons, Society of Thoracic Surgery

8.3 Evaluator of research applications in international competition

- DFG (Deutsche Forschungsgemeinschaft, Germany). Domain: Organ and Tissue Transplantation (2002-2006)
- Wellcome Trust (UK). Domain: Regenerative Medicine (2008-present)
- Italian Association for Research in Cancer (Italy). Domain: Experimental cancer research (2007-2008)
- EMEA (European Medical Agency). Domain: Stem cell and tissue engineering for end-stage lung diseases (since 2009)
- EU evaluator FP7 (EU, Brussels). Domain: Regenerative medicine and organ transplantation (2010-2013)

8.4 Evaluator of research applications in national competition

- None in Sweden;
- Fondo de Investigación Sanitario, Instituto de Salud Carlos III, Ministerio de Sanidad y Consumo, Spain (2006-2010)

8.5 Evaluator of major research grant applications in local competition

None

8.6 Editor of scientific journals

None

8.8 Member of an editorial board

- Journal of Heart-Lung Transplantation (1990-1993)
- Vascular and Myocardial Regeneration (1993-1996)
- Surgical Technology International (1996-1998)
- Transplant International (1998-2000)
- International Journal for Cancer Research (2005-2010)
- Lancet Oncology (2004-2007)
- Stem Cell Research and Therapy (2010-2012)
- Stem Cells Translation Medicine (2010-present)

8.8 Reviewer for scientific journals

- Cancer
- Annals Of Thoracic Surgery
- British Journal Of Cancer
- European Journal Of Cardio-Thoracic Surgery
- Annals of Surgical Oncology
- Journal of Thoracic and Cardiovascular Surgery
- Transplantation
- American Journal of Transplantation
- Biomaterials
- Lancet
- Lancet Oncology
- American Journal of Transplantation
- Cancer Letters
- Experimental Biology and Medicine
- Cytotherapy
- BioEssays
- Journal of the Royal Society Interface
- Journal of Healthcare Engineering
- Journal of Experimental & Clinical Cancer Research
- Critical Care Medicine
- Journal of Visualized Experiments
- Tissue engineering
- Nature
- British Medical Bulletin
- British Journal of Surgery
- Journal of Biomaterials Applications
- Journal of Chronic Obstructive Pulmonary Diseases
- Regenerative Medicine
- Cell Biochemistry and Function
- American Journal of Respiratory and Critical Care Medicine
- European Journal of Medical Research
- Stem Cell Research and Therapy
- Materials Science and Engineering B
- Proteome Science
- Journal of Applied Polymer Science
- Experimental and Toxicologic Pathology
- Biochemistry, Molecular Biology and Biophysics
- PLOS one
- International Journal of Molecular Sciences
- Journal of Chronic Obstructive Pulmonary Disease
- Biomedical Materials
- Biofabrication

8.8 Reviewer or advisor for other scientific bodies

- New Organ Alliance Advisory Board
- STEMCO- International Stem Cell Society Scientific Advisory Board
- European Union, Bioartificial organ and tissue Committee

8.9 Other relevant evaluation assignments

None

9 INTERNATIONAL VISITING RESEARCH FELLOWSHIPS

12/1993 – 4/1999	Thoracic Surgery and Transplantation, Paris-Sud University, Paris, France
4/2000 – 12/2004	Thoracic Surgery, Hannover Medical School, Hannover, Germany Director, Post-graduate (Residents & Fellows) Program of General Thoracic Surgery, Hannover Medical School, Hannover, Germany
3/2005 – 12/2009	General Thoracic Surgery, Universidad de Barcelona, Barcelona, Spain
1/2003 – 12/2007	European Association of CardioThoracic Surgery School-Airway Surgery, Bergamo, Italy
12/2005 – 12/2009	Associate Professor, General Thoracic Surgery, Universidad of Barcelona, Barcelona, Spain
3/2005 – 12/2009	Director, Post-graduate Program of General Thoracic Surgery, Hospital Clínic, Universidad de Barcelona, Barcelona, Spain PhD Supervisor, General Thoracic Surgery, Universidad de Barcelona, Barcelona, Spain
2/2007 – 12/2009	Master en Transplante de Órganos. Universidad de Barcelona, Barcelona, Spain
4/2008 – 12/2010	EU Master in Respiratory Medicine. Universidad de Barcelona, Barcelona, Spain
11/2010 – present	Visiting Professor, Karolinska Institutet, Stockholm, Sweden
10/2011 – present	Full Professor, Kuban State Medical University, Krasnodar, Russia

10 SCIENTIFIC DISTINCTIONS

- “Mejor Idea Médica” (2005), Diario Médico (E)
- Member of the Fleischner Society:

“The Fleischner Society is an **international, multidisciplinary medical society** for thoracic radiology, dedicated to the diagnosis and treatment of diseases of the chest. Founded in 1969 by eight radiologists whose predominant professional interests were imaging of chest diseases, the Society was named in memory of Felix Fleischner, an inspiring educator, clinician, and researcher who made many contributions to the field of chest radiology. The Society has had an active membership of approximately **65 members throughout its existence** as well as approximately 35 senior members, who have retired from active medical practice or work in medical science after years of active membership in the Society.

The Fleischner Society maintains a diverse membership that **includes experts in adult and pediatric radiology, pathology, adult and pediatric pulmonary medicine, thoracic surgery, physiology, morphology, epidemiology and other related sciences**. The diverse membership supports a primary role of the Society, which is the publication of Fleischner Position Papers, which represent consensus documents that focus on controversial topics.”

<http://fleischner.org/?s=paolo+macchiarini>

- Knight for scientific merits of the Republic of Italy (2010)
 - <http://www.quirinale.it/elementi/Onorificenze.aspx?pag=0&qIdOnorificenza=&cognome=macchiarini&nome=paolo&daAnno=1800&aAnno=2014&luogoNascita=&testo=&ordinamento=2>

11 OTHER SCIENTIFIC MERITS

Not applicable

12 RESEARCH PLAN (current and future combined)

The past preclinical and clinical regenerative experiences will be used to improve the following translational and reverse translational research fields:

A) Tissue engineering

The airway, esophagus and other tissue/organs, natural scaffolds: Continue work to improve our already clinically applied method of tissue engineered tracheal replacement and extend the acquired knowledge to the lungs, heart tissue (patches and full organ regeneration), esophagus, laryngeal, lung tissue, diaphragm, ureter, kidney, liver and brain replacements. The methodologies developed and used for previous and ongoing clinical cases will be explored in order to validate the biological and artificial scaffold production processes, selection of cells and bioreactor design to generate standardised protocols that can be used as standard operating procedures (SOPs) for clinical trials and for commercialisation processes. We have already established SOP for several of the above mentioned areas and will further develop this part of our ongoing research. Moreover, in order to develop a manageable animal model, such as a rat model, we will need to further investigate the process of tissue-engineered tracheal, esophageal and other tissue/organs for *in vivo* regeneration. The decellularization process utilizing a rat model will be investigated by histological, morphological and mechanical analysis and *in vitro* and *in vivo* pro-angiogenic properties evaluated. Besides, decellularized scaffolds will be investigated regarding their proteomic profile. The *in situ* regeneration of tissue-engineered tracheae and esophagi will then be evaluated by using *in vitro* and *in vivo* assays with respect to angiogenesis and epithelialization (Jungebluth et al. 2014 and Sjöqvist et al., 2014, respectively). Bone marrow mononuclear progenitor cells (MNCs) and mesenchymal stromal cells (MSCs) will be used to seed the matrices by either direct injection (or *via* specifically designed bioreactor) of cells into

decellularized or synthetic scaffolds. Cell migration, differentiation, protein (in particular pro-angiogenic) expression and matrix organisation will be monitored (via life-imaging). The impact of specific boosting factors (*e.g.*, Granulocyte Colony-Stimulating Factor, Erythropoietin, TGF-beta, VEGF-A, AMD3100, IL1-6) on tissue engineered esophagus constructs will therefore be studied *in vitro* on MNC and MSC cultures (cell survival, proliferation, differentiation and angiogenic potential and in recellularized tissue engineered tracheal and laryngeal constructs (cell migration, differentiation, protein expression and epigenetic profile prior and post-seeding)). Cells will be analyzed with multi-parameter flow cytometry for expression of a variety of markers for characterization of different cell types and cellular migration potential such as chemokine receptors as well as phenotype of MSCs, EPCs and HSCs. Additionally, we will continue to analyze systemic effects of progenitor mobilization using multiplex arrays to detect for a wide range of chemoreceptors, chemokines and growth factors. Mobilized cells will also be evaluated epigenetically to detect specific profile showing their activation/homing etc. (initial findings were obtained in the recently performed clinical transplantation of a stem cell seeded artificial graft). Tumorigenesis will be carefully investigated.

The airway, artificial scaffolds: The primary goal of this research is to continue to study mechanisms of synthetic airway scaffolds with the structural and biomechanical properties of the natural airways. Recently we performed several human transplantations of a stem cell seeded synthetic scaffold. However, the material must still be optimized to improve epithelial development and thus improve post-operative outcomes. Therefore different artificial materials such as a nanocomposite polymers (already successfully applied in the development of cardiovascular biomaterials and medical devices) and nanofibers matching natural biomechanical properties are being evaluated (10,11). Synthetic scaffolds are being individually tailored *via* 3-D printing and electrospinning mimicking the native architecture, avoid organ donors and can be sterilized. Starting from our preliminary studies, customized airway synthetic scaffolds will be manufactured using micro- and nanofibres spiral reinforcement made from the same biomaterial. In addition, various peptides are being investigated for surface modification and attachment on to the scaffold surface to enhance stem cell adhesion and differentiation. For each patient, specific scaffolds are being produced from computed tomographic (CT) scans, via computer-aided design and optimum porosity and cell density will be determined. The scaffold will be seeded *in vitro* and the resultant constructs monitored in the bioreactor. The performance of novel synthetic bioengineered scaffolds will be validated by comparison with decellularized biological scaffold materials. Considering that *i*) non-human primates (NHP) have phylogenetic similarities with humans, *ii*) that similarities between NHP and human regarding cell surface markers and immunological responses have been demonstrated, and that *iii*) ACTREM has the possibility to use the primate centre of Kuban State Medical University, Krasnodar, Russian Federation, the *in vivo* analysis will be performed on NHP (Rhesus macaques, *Macaca mulatta*) and porcine model at the Karolinska Institutet.

Other intrathoracic organs. The aims are to *a*) obtain esophagus, lung and heart scaffold by using a bioreactor (Harvard Apparatus Regenerative Technology) for each organ. The bioreactor allows for separate decellularization and recellularization under sterile conditions. Our clinically applied method of decellularization will be transferred to the mentioned organs. Likewise different protocols will be evaluated and criteria of optimum scaffold formulated. Engineered scaffolds will be investigated for proteomic profile and role of remaining proteins will be investigated. Different cell types (autologous and allogenic differentiated and undifferentiated cells)

will be used, such as MSCs, iPSCs, fetal lung cells, epithelial cells, Islet cells, etc. Cell binding, engraftment and differentiation will be studied within the different tissues and culture conditions. The possibility of influencing and improving cell differentiation will be studied by miRNA analysis and potential application during culture. Exosomes derived from MSCs will be investigated for their potential effect on cell adhesion, proliferation and differentiation. Beside the decellularization of healthy organs we aim to decellularize diseased tissue, such as fibrotic lungs. This will help to investigate the possibility of re-use of an otherwise unusable organ. *b)* the aortic root is of very high interest since the number of patients suffering from aortic valve disease is large *c)* Regarding the esophagus we plan to study different techniques such as cell sheet engineering and decellularized scaffolds. Both will be evaluated in animal models and, if successful, transferred to the clinic.

Epithelial tissue engineering: Different epithelial sources (nasal, laryngeal, tracheo-bronchial cells) will be evaluated to determine if cell origins can influence *in vitro* expansion and differentiation potential and if cells can be expanded to cover a scaffold pre implantation. Growth, differentiation and ciliated cell beat frequency will be evaluated. Epithelial biopsies and cells will be used to seed the inner surface of matrices. Cell migration, protein regulation involved in epithelial tissue engineering, epithelium microstructure and epithelial layer functionality will be evaluated. Recently the crucial role of mi- RNAs of the miR-34/449 family for the differentiation of stem cells into bronchial ciliated cells has been described in a mouse model. We could show their influences for this particular issue for the first time in man. Further studies will be performed to elucidate their real meaning for stem cell differentiation and how to use the potential to guide and enhance the development of epithelial cells. Obtained findings will be transferred to our lung tissue engineering study and potentially applied in clinic. Together with one of our collaboration partners (Novalung, Hechingen, Germany) we will investigate the possibility to seed and cover artificial membranes with endothelial progenitor cells and pneumocytes for clinical implantation and/or ambulatory application for improved gas exchange. Several questions need to be answered such as cell attachment, differentiation, which cell type to use, immunological response, functionality and survival. Studies will be monitored by life-imaging and confocal microscopy. Cells can be labeled via GFP-expressing virus. *In vitro* and *in vivo* (large animal) studies needs to be performed.

B) Cell Therapy for airway diseases

Continue to investigate the pathological mechanisms involved in the development of lung parenchymal and vascular diseases (such as PH, COPD and lung cancer). Common pathophysiological mechanism of PH, COPD and lung cancer will be evaluated in different animal models: for PH, we will use our recently published small animal model of rats (5), while for COPD and lung cancer an animal model of chronic inflammation induced by tobacco smoke will be used. Genetically modified animals (Cre-activatable K-rasG12D allele (*K-rasLox- STOP-Lox (LSL)-G12D/WT*) and a conditional loss-of-function p53 allele (*p53Flox/Flox*) will allow proteomic evaluations. Respiratory tract organs will be evaluated on cellular and protein levels both in healthy and in diseased conditions to detect for common overlapping mechanisms *via* histology, immunohistochemistry, electron microscopy and proteomics. Based on the presumption that chronic inflammatory stimuli might initiate and promote lung cancer in damaged lung tissue, underlying inflammatory mechanisms, such as Notch signaling and NF-kappaB and, their downstream pathways will be elucidated. Moreover, to evaluate inflammatory response on external stimulus and/or endogenous modification (genetically modified), lung tissue will be investigated for IL-1-beta, IL-

6, TNF-alpha Mip 1 alpha and Mcp 1 with ELISA assay. Both in the healthy native and in the diseased lung we propose to detect and isolate putative lung epithelial progenitor potential (such as CC10+, K5/K14+, CGRP+, SPC+ and CC10/SPC+ and C-Kit pos. cells) and thus synonymic with niche cells. Besides, the potential of up- and downregulating these cells will be one target challenge. Moreover, we aim to characterize cancer cells (isolated from patients with lung or trachea cancer) and investigate for so-called cancer stem cells. Different genetic analyses will be performed. In order to provide general accepted data and knowledge to the field of cell therapy we developed a theoretical mathematical model. The model can help to predict cell distribution and standardize the treatment. We will further evaluate the model and reveal its *in vivo* relevance.

C) Cell biology

Our clinical protocol for tracheal tissue engineering and cell therapy includes MSCs and MNCs. In order to define these two cell populations more accurately and detect their respective capacity we will perform several *in vitro* studies followed by experimental animal studies. Currently we perform beam radiation studies, mimicking radiatio therapy in patients. We aim to investigate whether the cell proliferation and differentiation characteristics (of the two cell types) differ in patients undergoing adjuvant radio-therapy. This is relevant in patients suffering from malignancies and undergoing transplantation of engineered tissues/organs. Various proliferation and established differentiation assays will be applied.

Moreover, we aim to characterize cancer cells (isolated from patients with lung or trachea cancer) and investigate for so-called cancer stem cells. Different genetic and epigenetic analyses will be performed. A whole characterization panel has been recently defined by our group (Lim et al. 2014 *accepted*).

Exosomes: Exosomes will be isolated from MSCs and MNCs and tested against each other regarding their antiinflammatory and homing capacity, as well as the influence on cell adhesion, proliferation and differentiation. The overall aim of these study is to replace cell through exosomes only in the future. This would avoid various ethical and technical concerns in the field of tissue engineering and cell therapy.

Performed proof of concept. Work to develop the preclinical data of esophageal tissue engineering starting with basic *in vitro* studies to understand native structural architecture, mechanical, histochemical properties, and immuno- competence. Optimum culture conditions were obtained and a specific- bioreactor designed. The complete cell biology is being evaluated. These preclinical data will be required for the provision of a Clinical Trial Authorization (CTA) and then a First-in-Man Trial (FIMT) using natural scaffolds to replace benign and malignant diseased esophagi. The decellularization method, pharmacological strategy to boost regeneration, use mononuclear cells, clinical indications and surgical techniques will need to be strictly defined, providing definitive guidelines for a tissue engineered esophageal replacement.

Additionally, we are continuously improving and adapting the already applied methods for optimum clinical outcome of tissue engineered tracheal transplatation with reverse translational research that reflects our ongoing clinical findings (we recently established a data base allowing various levels of data access to the respective collaborative partners). Addressing each of the issues proposed will help to bring forwad clinical therapeutic concepts of regenerative medicine and will move us beyond state-of-the-art by allowing us to scale-up our existing technique from one that can be used for individual patients to one that can be rolled out to a large population of patients in a

simple, reproducible and routine technique, commercially effective and in a socially acceptable way.

KAROLINSKA INSTITUTET

TEACHING PORTFOLIO

1 SUBJECT AREA COMPETENCE AND CURRENT TEACHING ACTIVITY

10/2011 – present Regenerative Medicine, Thoracic Surgery
Full Professor, Kuban State Medical University, Krasnodar,
Russia
<http://www.regmedgrant.com/index.php?id=4&lang=eng>

2 TEACHING IN THE STUDY PROGRAMME

- Faculty of Medicine, University of Pisa, Italy (1988-1992):
 - Bachelor level:*
 - Weekly bedside classes for medical students and clinical education
 - Lung and bronchial surgery procedures
 - Doctoral and Clinical Level:*
 - Lung and bronchial surgery procedures (Pneumology fellows)
 - Lung and bronchial surgery procedures (General surgical fellows)
 - Lung and bronchial surgery procedures (Emergency surgical fellows)
- Institut Marie et Curie, Sorbonne University, Paris, France (1992):
 - Doctoral and Clinical level:*
 - Angiogenesis and solid malignancies
- Faculty of Medicine, Paris-Sud University Paris, France (1993-1996)
 - Bachelor level:*
 - Weekly bedside classes for medical students and clinical education
 - Doctoral and Clinical Levels:*
 - Lung and Surgery of the malignant thyroid cancer
 - Surgical procedures of Pancoast-tumors
- University Franche-Compte, Beçanson, France (1996-1999)
 - Master in Organ and Tissue Transplantation
 - Heart-lung-transplantation
 - Principles and immunology of xenotransplantation
- Medizinische Hochschule Hannover, Hannover, Germany (2001- 2004)
 - Bachelor level:*
 - Weekly bedside classes for medical students and clinical education
 - Doctoral and Clinical Level:*
 - Principles of general thoracic surgery
 - Principles of esophageal and mediastinal surgery
 - Principles of lung cancer (staging and surgical therapy)
 - Director, Post-graduate (Residents and Fellows) program of general thoracic surgery (<http://www.aekn.de>)
- University of Barcelona, Barcelona, Spain (2005-2010)
 - Director, Post-graduate Residents and Fellows) program of general thoracic surgery (http://www.separ.es/separ-mir/programa_formacion.html)
 - EU Master in Respiratory Medicine. Lectures in principles of airway surgery and surgical techniques in general thoracic surgery and Principles of regenerative medicine.
 - Master in Organ Transplantation. Lectures in Lung and Heart lung

transplantation and tissue engineered replacements of intrathoracic organs and complex tissues.

- Master Intensive Care Unit. Lectures in Thoracic Trauma.
- Faculty of Medicine, University of Florence (Italy). (2010-2013)
 - Doctoral and Clinical Level:*
 - Lecturer in Reconstructive surgery of the airway (4th year)
 - Principles of regenerative medicine (5th year).
- European Post-graduate School of Cardiothoracic Surgery, Bergamo (Italy). (2003-2007).
 - Director of the Airway Surgical Program (clinical level)
- University of Modena, Italy (2010-2013)
 - Doctoral Level:*
 - Lecturer, principles of tissue engineering and cell therapy of respiratory diseases.
 - Master regenerative medicine
- Kuban State Medical University, Krasnodar, Russia (2012 – present)
 - Doctoral Level:*
 - Master class in tissue engineering

2.1 Scope/time of teaching

- As assistant, associate and professor:
 - Lectures for medical students and clinical and research fellows instruction, Kuban State University (Russia) *Since 2011*
 - Lectures for medical students and clinical and research fellows instruction, Karolinska Institutet, (Sweden). *Since 11/2010*
 - Lectures in reconstructive surgery of the airway and principles of regenerative medicine. Faculty of Medicine, University of Florence, (Italy). *2010-2012*
 - Lecturer, principles of tissue engineering and cell therapy of respiratory diseases. Master of regenerative medicine, University of Modena (Italy). *2010-2012*
 - Lectures in principles of airway surgery and surgical techniques in general thoracic surgery; Principles of regenerative medicine, EU master in respiratory medicine. University of Barcelona (Spain). *04/2008–12/2010.*
 - Lectures in lung and heart lung transplantation and tissue engineered replacements of intrathoracic organs and complex tissues. Master in organ transplantation. University of Barcelona (Spain). *02/2007-12/2009.*
 - Director and Lecturer, Post-graduate program of general thoracic surgery, University of Barcelona (E). *03/2005-12/2009.*
 - Lectures in thoracic trauma and extracorporeal lung support. Master Intensive Care Unit. University of Barcelona (Spain). *03/2005/12/2009.*
 - Director of the Airway Surgical Program, and lecturer in anatomy, function and imaging of the trachea, diagnosis and treatment of benign tracheal stenosis and tracheoesophageal fistulas, surgical management of tracheal tumors, principles of pediatric airway surgery, European School of Cardiothoracic Surgery, Bergamo (Italy). *01/2003-12/2007.*

- Director, Post-graduate program of general thoracic surgery, Heidehaus Hospital, Hannover Medical School (Germany). 04/2000-12/2004.
- Lectures in general thoracic surgery and lung and heart-lung Transplantation, Faculty of Medicine, Paris-Sud University (France). 12/1993-04/1999.
- Lectures to student first and second level, Faculty of Medicine, University of Pisa (Italy). 1/1988-12/1992.
- As supervisor or (academic and hospital) program director:
 - University of Pisa (Pisa, Italy)
 - 1988: Ruschi, Stefano. Title: Pulmonary function and bullous emphysema. Diploma in Pneumology. Published in: *Minerva Pneumol* 1990; 29:9-18.
 - 1989: Ricagna, Fabio. Title: *Functional results of sleeve lobectomy*. Diploma in General Surgery. Published in: *Eur J Cardio-Thorac Surg* 1991; 5:410-3.
 - 1990: Pieri, Marco. Title: *Most peripheral non small lung cancers have low proliferative rates and no intra- or peritumoral vessel invasion*. Thesis in medicine and surgery. Published in: *J Thorac Cardiovasc Surg* 1992; 104:892-9.
 - University of Alabama at Birmingham (Alabama, USA)
 - 1991: Hsu, Chuanchieh. Title: *Invasion of blood vessels by tumor cells predicts recurrence of bronchogenic cancers*. Diploma in biomedical statistics. Published in: *J Thorac Cardiovasc Surg* 1993; 106:80-9.
 - Université de Franche-Comté, (Besançon, France)
 - 1995: Murakami, Shinia. Title: *Prevention of reperfusion injury by inhaled nitric oxide in lungs harvested from non-heart-beating donors*. DEA in Transplantation d'Organe et Greffe de Tissu. Published in: *Ann Thorac Surg* 1996; 62:1632-8.
 - 1996: Bacha, Emile. Title: *Inhaled nitric oxide attenuates reperfusion injury in non-heart beating donor lung transplantation*. DEA in Transplantation d'Organe et Greffe de Tissu. Published in: *Transplantation* 1997; 63:1380-6.
 - 1997: Guerra, Nadia. Title: *Polymerase chain reaction analysis of nude mice generated human tracheas transplanted in piglets*. DEA in Transplantation d'Organe et Greffe de Tissu. Published in: *Transplantation* 2000; 70: 1555-9.
 - Université d'Angers (Angers, France)
 - 1998: Shukri, Tamara. Title: *Identification des antigènes responsable du rejet hyperaigue dans un modèle de xenotransplantation pulmonaire orthotopique cochon-chèvre*. Diploma in Cellular Biology.
 - Université de Rennes I (Rennes, France)
 - 1998: Verhoye Jean-Philippe: *Tracheo-esophageal complications from mechanical ventilation*. Thesis in Medicine et Chirurgie. Published in: *J Thorac Cardiovasc Surg* 200; 121: 68-76.
 - Medizinische Hochschule Hannover, Hannover, Germany

- 2003: Breitbach, Sven. Title: *Adenovirale Vektoren - PCR- gestütztes Screening zur Korrelation von Adenoviren und intrathorakalen Malignomen*. Thesis in medicine and surgery.
- 2003: Karsten Schroeder. Title: *Der Einfluß der Lymphadenektomie auf intrathorakale Volumina bei Lungenresektionen wegen nicht-kleinzelligem Bronchialkarzinom*. Thesis in medicine and surgery.
- 2003: Gruhn, Silke. Title: *Role der apnoische oxygenierung in der Trachealchirurgie*. Thesis in medicine and surgery.
- 2005: Karsten Kuhn. Title: *Evaluierung der transkardiopulmonalen Einzelindikator-Thermodilution nach Lungenresektionen wegen nicht-kleinzelligem Bronchialkarzinom unter besonderer Berücksichtigung der Lymphadenektomie*. Thesis in medicine and surgery.
- 2006: Biancosino, Christian. Title: *Generation of a bioartificial fibromuscular tissue with autoregenerative capacities for surgical reconstruction*. Thesis in medicine and surgery. Published in: *Cytherapy* 2006;8(2):178-83
- 2008: Lars Jasper. Collaboration work with Eicken, Nicken. Title: *Cetriaxon, Amoxicillin und Ampicillin/Sulbactamals perioperative Antibiotikaprophylaxe in der elektiven Lungenchirurgie*. Thesis in medicine and surgery.
- 2010: Städtler, Nina. Title: *Prospektive Analyse der Ösophagusfunktion nach Pneumonektomie*. Thesis in medicine and surgery
- Jungebluth, Philipp. Title: *A potential approach for tracheal reconstruction: biotissue engineering of a tracheal tubular graft*. Thesis in medicine and surgery. Published in: *Lancet* 2008, *J Thorac Cardiovasc Surg* 2009 and 2010, and *Biomaterials* 2009.
- 2012: Haag, Johannes. Title: *Improved biomechanics of tracheal natural scaffolds using cross-linking natural agents*. Thesis in medicine and surgery
- Jorjani, Jafar. Title: *Interrelation between intensive care patients and general thoracic surgery*. Thesis in medicine and surgery.

Faculty of medicine, University of Florence, Florence, Italy

- 2003: Leonardo Polizzi. Title: *Role der apnoische oxygenierung in der Trachealchirurgie*. Thesis in medicine and surgery.

Post-doctoral (PHD) Supervisor:

University of Barcellona, Barcellona, Spain:

- Dr. Manoli Iglesias. Title: *Experimental and clinical extracorporeal mechanical ventilation in refractory acute distress respiratory syndrome*. (to be presented).
- Dr. David Sanchez. Title: *Pre-clinical efficacy of a novel*

extracorporeal ventilation device. (to be presented).

- Dr. Alberto Rodriguez. Title: *Cellular and molecular endothelial dysfunction in chronic pulmonary embolism.* (to be presented).

Medizinische Hochschule Hannover, Hannover, Germany:

- Dr. Jungebluth Philipp. Title: Regenerative approaches to end-stage diseases of the airways. Expected sustenance: June 2013

Karolinska Institutet, Stockholm, Sweden

- Sebastian Sjöqvist. Title: Tissue engineering and stem cell therapy for esophageal disorders. Clinical Scientist Training Programme (CSTP) Karolinska Institutet (2011-2014)

Educational and academic responsibilities have always been one of Dr. Macchiarini's major concerns. Educational priorities have always targeted medical students early and emphasized the importance of mentorship throughout their careers. Other major foci have been maximizing the quality of clinical research, re-emphasizing a basic science research commitment, encouraging surgical research, and recognizing and encouraging residents' interest in academics. His philosophy has always been: through mentoring and fostering state-of-the-art medical and scientific education, one could expect that new medical forces will be accrued on a neutral financial basis through the clinical and, especially, experimental environment. Therefore, his primary teaching activity, taking up approximately 25% FTE:

- i. focused on the clinical teaching of surgical (first and second level) residents, fellows and junior staff;
- ii. included the organization/establishment of research laboratories and clinical departments in several EU countries and academic institutions;
- iii. included the creation of collaboration and groups all over the world to establish cutting-edge expertise and knowledge.

2.2 Form of instruction

Lectures:

- Lectures for medical students and clinical and research fellows instruction, Karolinska Institutet, Stockholm (Sweden).
- Lectures in reconstructive surgery of the airway (4th year) and principles of regenerative medicine (5th year). Faculty of Medicine, University of Florence (Italy).
- Lectures in principles of tissue engineering and cell therapy for respiratory diseases. Master of regenerative medicine, University of Modena (Italy)
- Lectures in principles of airway surgery and surgical techniques in general thoracic surgery (4th year); Principles of regenerative medicine (5th year), EU master in respiratory medicine. University of Barcelona (Spain).
- Lectures in lung and heart lung transplantation and tissue engineered replacements of intrathoracic organs and complex tissues. Master in organ transplantation. University of Barcelona (Spain).
- Director and Lecturer, Post-graduate program of general thoracic surgery, Hospital Clinic, University of Barcelona (Spain).
- Lectures in thoracic trauma and extracorporeal lung support. Master Intensive Care Unit. University of Barcelona (Spain).
- Director of the Airway Surgical Program, and Lecturer in anatomy, function and imaging of the trachea, diagnosis and treatment of benign tracheal stenosis

and tracheoesophageal fistulas, surgical management of tracheal tumors, principles of pediatric airway surgery, European School of Cardiothoracic Surgery, Bergamo (Italy).

- Director, Post-graduate (Residents & Fellows) program of general thoracic surgery, Heidehaus Hospital, Hannover Medical School (Germany).
- Lectures in general thoracic surgery and lung and heart-lung Transplantation, Faculty of Medicine, Paris-Sud University (France).
- Lectures to student first and second level, Faculty of Medicine, University of Pisa (Italy).

Organized seminars:

- Principles of mechanical ventilation and aponoic oxygenetaion. Hannover, Germany, March 15, 2001.
- Surgical Therapies of the Bronchial Carcinoma, therapy and diagnostic. Hannover, Germany, March 15, 2003.
- Lung Cancer. Cancer information day: “*Der Mensch im Mittelpunkt*”. Oncological Circle Hannover. Hannover (D). March 22, 2003.
- Diagnosis and treatment of mediastinal tumors. Hannover, Germany, March 16, 2004.
- Current status of extracorporeal lung assist devices. University of Barcelona, Barcelona, Spain. April 4, 2006
- Surgical approach to pulmonary hypertension. University of Barcelona, Barcelona, Spain. June 7, 2007
- Regenerative approached to diseases of the respiratory system. University of Barcelona, Barcelona, Spain. January 12, 2009

2.3 Teaching assignments

- See all listed above

2.4 Examination and assessment

- Scope of and responsibility for different kinds of examination (theoretical, practical, oral or written) and development of assessment criteria.
- Theoretical and practical exams (summer and winter session annually) at the Hannover Medical School (2000 and 2004);
- Examiner and final evaluator of the national exams for the general thoracic surgeon specialization at the Lower Saxony medical chamber Germany (2000-2004);
- Theoretical and practical exams (summer and winter session annually) of the post-graduate courses in thoracic and general surgery and intensive care at the University of Barcelona, Barcelona, Spain (2005- 2009).

2.5 Production of study materials and instructional materials

See list of book chapters and invited lectures listed above. All educational /pedagogical activities over the last several years have been associated with printed educational materials, textbooks and, more recently, with online material.

2.6 Course evaluation, and evaluation of instruction and study programme

- Course evaluations are useful to obtain information about the impact of teaching methods on student learning and for constant improvement
- Honorary Professor of Surgery at the University College in London;
- Invited Professor at the Russian Academy of Medical Sciences (RAMS) with Master classes for Regenerative Medicine and tissue engineering (20

- hours/year), since 2010—all of which are evaluated by students at the University
- Evaluation by students has been done after each course/lecture (Hannover 2000-2004 and Barcelona (2005-2009). Analysis of student writing, projects, essays, and oral presentations were used to evaluate student understanding of my teaching. Based on this, the educational activity of the next academic year was confirmed/improved.
 - To me, the proof of my teaching activities is that almost all of my previous students and fellows contact me frequently to get advice and discuss scientific and clinical issues. 9 out of 12 fellows in general thoracic surgery have become chief of thoracic surgery in Germany and Spain.

2.7 Internationalisation

- Participation in teacher exchanges with overseas universities.
- Erasmus Exchange program, Faculty of Medicine, University of Barcelona

3 TEACHING IN NURSING AND MEDICINE AND FOR HEALTHCARE PRACTITIONERS

3.1 Teaching in nursing and medicine

Classes to Nurse High School (operative nurses)

- 1993-1996: Pathology of the Thorax (University Anger, Anger, France);
- 1996-1999: Heart-lung and Lung-Transplantation (University Paris- Sud, Paris, France);
- 1997-1999: Surgical intervention in lungs and bronchi (University Paul Vaillard, Villejuif, Paris France);
- 2000-2004: As member of PTFZ (pediatric research center, Hannover, Germany), monthly information meetings for patients, parents and physicians to develop clinical trials, experimental projects, monitoring and evaluation of data and parameters, provide education and courses for both physicians and health care staff, providing web- based information and discussion forum, inclusive tele-medical approaches

3.2 Teaching for healthcare practitioners

- Leader of an expert group for intrathoracic tumors (A II), (Hannover, Germany);
- Member of a monthly interdisciplinary conference (certificated by the National Medical Association (2 creditis) and by the Internal-Oncology group of the German Society of Cancer (AIO) (5 credits);
- Faculty Member of the Post-graduate European School for Cardiothoracic Surgery: general thoracic Surgery and post-operative management of thoracic surgery patients;
- Member of the Interdisciplinary pediatric thorax center (PTZH, Medizinische Hochschule Hannover). Center for Children and Teenager with congenital and acquired severe diseases affecting thoracic organs with the necessity of interdisciplinary diagnostics and therapies;
- Giving lectures at international post-graduate courses (since 1991).

4 DEVELOPMENT OF TEACHING SKILLS

4.1 Formal studies in university-level teaching

Internal courses:

Weekly grand rounds, seminars, invited conferences in the fields of general thoracic surgery and regenerative medicine (Hannover Medical School, 1999-2004; University of Barcelona, 2005-2010);

External courses:

CME (continual medical educations) in the fields of cardiothoracic surgery (Hannover Medical School, 1999-2004; Hospital Clinic, University of Barcelona, 2005-2010). The following are selected symposiums, post-graduate courses, and educational meetings:

- *Symposium on Thoracoscopy and Video Assisted Thoracic Surgery*. 74th Post-graduate course of the Annual Meeting American Association of Thoracic Surgery (AATS), New York (USA), 24-27 April, 1994.
- Lung Xenotransplantation. *General Thoracic Biology Club*. 77th Post-graduate course of the Annual Meeting of the American Association of Thoracic Surgery. Washington DC (USA). May 4, 1997.
- Extended resection for lung cancer. *European School of Oncology*. Royal Brompton Hospital, London (UK), October 10-14, 1997.
- Epidemiology of lung diseases and its impact on thoracic surgery. In: *Management course in cardio-thoracic surgery*. Palma de Mallorca (Spain), November 23-25, 1997.
- The future of lung transplantation: lung xenotransplantation. *51 Annual Meeting of the Japanese Association of cardiothoracic surgery*. Post-graduate course. Tokyo (Japan), October 2-5, 1998.
- International training of a general thoracic surgeon. Thoracic surgery postgraduate course. *87th American College of Surgeons*, New Orleans (USA), October 18, 2001.
- Apnoeic tracheal surgery. *General Thoracic Surgery Post-graduate Course, EACTS*, Monaco (Montecarlo), September 22, 2002.
- Pancoast Tumors. *Post-graduate course in General Thoracic Surgery*. *German Society for Thoracic and Cardiovascular Surgery*. Kiel (Germany), October 8, 2002.
- How I do it: Carinal resections. *Post-graduate Course General Thoracic Surgery*. *83rd AATS Meeting*. Boston (USA), May 3rd, 2003.
- Surgery of the upper thoracic aperture. *1st Post-graduate course of the German-Italian Thoracic surgery*. Bolzano (Italy), November 22, 2003.
- Utilización de transplante de vasos cadavéricos en el tratamiento quirúrgico de los tumores intratorácicos. *III Simposio Oncológico para Profesionales Sanitarios*. Benavente (Spain), 20-21 October, 2006.
- Tratamiento quirúrgico de la hipertensión arterial pulmonar. Hipertensión Pulmonar. *IV Curso práctico de actualización cardiovascular*. Barcelona (Spain), 2-3 November, 2006.
- Rare tumors: Chest wall tumors. *ESMO International Symposium (EIS) of Chest Tumors*. Geneva (Switzerland), 30 March – 1 April, 2007.
- Resección de la carina traqueal: planteamiento teórico. *Curso de Actualización en Técnicas Quirúrgicas Torácicas*. Salamanca (Spain), 29-

30 May, 2007.

- Resección y reconstrucción de la vena cava superior. Enfermedad Vasculat Pulmonar. *Curso FMC-SEPAR*. Castelldefels (Spain), 5-6 October, 2007.
- Conferencia Inagural: Asistencia Ventilatoria Extracoporal. *Ier Seminario Cuidados Respiratorios*. Ciudad Real (Spain), 27-29 February, 2008.
- Presentación teórica: Cómo lo hago. Abordaje transpericárdico de la carina traqueal. *II Curso Avanzado de Cirugía Torácica. Hospital Universitario de Salamanca*. Salamanca (E), 16-18 June, 2008.
- Tracheo-bronchial transplantation. ESTS – *European Society of Thoracic Surgeons*. Post-g Elancourt, Paris (France) 2-3 March, 2009.
- Il futuro dei trapianti clinici con tessuti ingegnerizzati. *8° Corso di formazione avanzata. Medicina Rigenerativa cellulare: realtà e prospettive*. Collegio Ghislieri , Pavia (Italy). 20 March, 2009.
- Tissue and cell engineering. Annual Meeting of INFARMED Ministry of Healt (Medicamentos e productos de saude: Inovacao, acessibilidade e sustentabilidade). Lisboa (Portugal), 15 May 2009.
- Tissue engineering cell restoration and replacement. *Conference of the EACTS on advanced therapies in general thoracic surgery*. Post-graduate course. Wien (Austria), 21st October 2009.
- Progress in airway surgery. *46th Annual Meeting of the Society of Thoracic Surgeon (Techno-College Post-graduate course)*. Fort Lauderdale (USA) January 2010.
- Tracheal Reconstruction with Tissue Engineered Airway. *90th Annual Meeting of the American Association of Thoracic Surgery. Post-graduate Course*. Toronto (Canada), May 1-5, 2010.
- *General Thoracic Surgery Harvard Medical School Course*, Boston (USA) May 27-28, 2010.
- Stem Cell Symposium. Airway tissue engineering. *5th young European scientist meeting*. Porto (Portugal) 24-26 September, 2010.
- Research design and preparing grant proposal in thoracic surgery. *6th National Thoracic Surgery Congress*. Post-graduate course. Antalya (Turkey) April 30, 2011.
- Tissue engineering and cell therapy for the respiratory system. *American Thoracic Society International Conference*. Post-graduate course. Denver (USA), May 16, 2011.

Other educational /pedagogical activities. All the above listed are all international educational and/or pedagogical conferences that I have been involved and attended.

4.2 Other teaching activities

Organized seminars:

- Principles of mechanical ventilation and aponoic oxygenation. Hannover, Germany, March 15, 2001.
- Surgical Therapies of the Bronchial Carcinoma, therapy and diagnostic. Hannover, Germany, March 15, 2003.
- Lung Cancer. Cancer information day: “*Der Mensch im Mittelpunkt*”. Oncological Circle Hannover. Hannover (D). March 22, 2003.
- Diagnosis and treatment of mediastinal tumors. Hannover, Germany, March 16, 2004.
- Current status of extracorporeal lung assist devices. University of

- Barcelona, Barcelona, Spain. April 4, 2006
- Surgical approach to pulmonary hypertension. University of Barcelona, Barcelona, Spain. June 7, 2007
 - Regenerative approached to diseases of the respiratory system. University of Barcelona, Barcelona, Spain. January 12, 2009

Other education invited speaker events:

INVITED SPEAKER

1. Lung cancer and angiogenesis. *6th World Conference on Lung Cancer*. Melbourne, Australia. November 10-14, 1991.
2. Extended resection for non-small cell lung cancer. *2nd International Meeting "Cardiac diseases in cancer patients"*. Pordenone, Italy. April 15-17, 1994.
3. *2nd International Symposium on Thoracoscopy and Video Assisted Thoracic Surgery*. 75th Annual Meeting American Association of Thoracic Surgery, New York, US. April 24-27, 1994.
4. *1st International Symposium In Recent Advances Of Thoracic And Thoracoscopic Surgery*. Riyadh Medical Complex, Saudi Arabia. November 12-14, 1996.
5. Lung Xenotransplantation. *General Thoracic Biology Club*. 77th Annual Meeting of the American Association of Thoracic Surgery. Washington DC, US. May 4, 1997.
6. Management of Superior Sulcus Tumors. *Harvard Medical School*. Boston, US. May 22, 1997.
7. *Current status of lung transplantation*. Forli, Italy, June 20, 1997.
8. Lung transplantation. *University of Laval*. Quebec, Canada. July 22, 1997.
9. Extended resection for lung cancer. *European School of Oncology*. Royal Brompton Hospital, London, UK. October 10-14, 1997.
10. Epidemiology of lung diseases and its impact on thoracic surgery. In: *Management course in cardio-thoracic surgery*. Palma de Mallorca, Spain. November 23-25, 1997
11. Extended resections for lung cancer. *Hannover Medical School*, Hannover, Germany. June 5, 1998.
12. Surgical management of stage IIIB and IV lung cancer. *51st Annual Meeting of the Japanese Association of cardiothoracic surgery*. Tokyo, Japan). October 2-5, 1998.

13. The future of lung transplantation: lung xenotransplantation. *51st Annual Meeting of the Japanese Association of cardiothoracic surgery*. Tokyo, Japan. October 2-5, 1998.
14. Surgery for locally advanced lung cancer. *Kanazawa University*, Kanazawa, Japan. October 7, 1998.
15. Surgical replacement of the superior vena cava: indications, technique and results. *Surgery Meets high-tech in the information age*. Munich, Germany. December 10, 1998.
16. Extended resection for lung cancer. *International College of Surgeons*. San Lorenzo de El Escorial, Spain. June 17-18, 1999.
17. Lung Xenotransplantation. *International College of Surgeons*. San Lorenzo de El Escorial, Spain. June 17-18, 1999.
18. Extended resection for locally advanced non-small cell lung cancer. *Homburg University*. Homberg, Germany. January 15, 2000.
19. Is there a role of surgery for N3 non-small cell lung cancer? Post-graduate course in General Thoracic Surgery. *Italian Society of Thoracic Surgery*. Bari, Italy, October 7-8, 2000.
20. The thoracic inlet: Gateway to the chest. *University of Bristol*, Bristol (UK), November 23, 2000.
21. International training of a general thoracic surgeon. Thoracic surgery postgraduate course. *87th American College of Surgeons*. New Orleans, US. October 18, 2001.
22. Surgical management of the subglottic airway. *Royal Bristol Infirmary*. University of Bristol. Bristol, UK. November 12, 2001.
23. The bioartificial Lung. *31st Annual Meeting German Society for Thoracic and Cardiovascular Surgery*. Leipzig, Germany. February 17-20, 2002.
24. Advances in tracheal surgery. *5th Congress Turkish Thoracic Society*. Antalya, Turkey. April 24-28, 2002.
25. Pulmonary Thromboendarterectomy. *5th Congress Turkish Thoracic Society*. Antalya, Turkey. April 24-28, 2002.
26. Superior sulcus tumors. *NATO- advanced research seminar in thoracic oncology*. Kroshnava, Russia. April 29, 2002.
27. Chronic thromboembolic pulmonary disease. *Institute of Pneumology and Thoracic Surgery. University of Barcelona*. Barcelona, Spain. May 14, 2002.

28. Recent advances in tracheal surgery. *Institute of Pneumology and Thoracic Surgery. University of Barcelona.* Barcelona, Spain. May 14, 2002.
29. Apnoeic tracheal surgery. *General Thoracic Surgery Post-graduate Course EACTS, Monaco.* September 22, 2002.
30. Pancoast Tumors. *Post-graduate course in General Thoracic Surgery. German Society for Thoracic and Cardiovascular Surgery.* Kiel, Germany, October 8, 2002.
31. Pulmonary thromboendarterectomy. *University of Palermo.* Palermo, Italy, November 8, 2002.
32. Surgery of the superior vena cava. Deep venous surgery and new technologies for varicose veins. *Updating Course in Vascular Pathology of Surgical Interest. III Edition. University of Pisa.* Pisa, Italy. November 30-December 1, 2002.
33. How I do it: Carinal resections. *Post-graduate Course General Thoracic Surgery. 83rd AATS Meeting.* Boston, US, May 3, 2003.
34. Trachea substitutes. *3rd Sheffield Seminar in Thoracic Surgery.* Sheffield, UK. May 15-16, 2003.
35. Principles of cardiopulmonary bypass, ECMO, artificial lung. *European School of Cardiothoracic surgery.* Bergamo, Italy. June 2, 2003.
36. Surgery of the upper thoracic aperture. *1st Post-graduate course of the German-Italian Thoracic surgery.* Bolzano, Italy, November 21-22, 2003.
37. Implication of interferon- β on the mediastinal lymphangiogenesis. *Post-graduate course of the 26th German Oncology Congress.* Berlin, Germany. February 28-March 2, 2004.
38. Anatomy, function and Imaging of the trachea. *European School of Cardiothoracic surgery.* Bergamo, Italy. June 4-6, 2004.
39. Diagnosis and therapy of benign tracheal stenosis and tracheoesophageal fistulas. *European School of Cardiothoracic surgery.* Bergamo, Italy. June 4-6, 2004.
40. Surgical management of tracheal tumors. *European School of Cardiothoracic surgery.* Bergamo, Italy. June 4-6, 2004.
41. Principles of paediatric trachea surgery. *European School of Cardiothoracic surgery.* Bergamo, Italy. June 4-6, 2004.
42. Conferencia entre especialidades m3dicas relacionadas: conflicto o viabilidad. *VIII Foro Cardiovascular.* Madrid, Spain. March 11-12, 2005.

43. Conferencia Magistral: Tratamiento quirúrgico y endoscópico del enfisema pulmonar. *23 Diada Pneumològica de la Societat Catalana de Pneumologia (SOCAP)*. Sant Cugat. Barcelona, Spain. April 8-9, 2005.
44. *XII Annual Meeting of the German Society of Thoracic Surgery*. Berlin, Germany. June 1-5, 2005.
45. Tratamiento actual de la hipertensión pulmonar tromboembólica crónica: Opciones quirúrgicas. *Congreso Anual de la Sociedad Española de Neumología y Cirugía Torácica (SEPAR)*. Valencia, Spain. June 10-13, 2005.
46. Advances in chronic thromboembolic pulmonary hypertension: Experience of the spanish groups. *VIII Annual Meeting of the Pulmonary Circulation Working Group Spanish Society of Cardiology*. Alicante, Spain. November 11, 2005.
47. La Chirurgia della trachea: indicazioni e problematiche. *II Giornata di Patologia Toracica*. Catania, Italy. February 23-26, 2006.
48. The actual status of the artificial lung. *2nd General Thoracic Surgery Course*. Bursa, Turkey, June 15-17, 2006.
49. Surgical Management of airway disease. *British resident annual meeting*. Crew, UK. February 3, 2006.
50. La Chirurgia della trachea: indicazioni e problematiche. *II Giornata di Patologia Toracica*. Catania, Italy, February 23-26, 2006.
51. Tratamiento multimodal del tumor de pancoast. *3ª Jornada de Radioquimioterapia en el Cáncer de Pulmón*. Barcelona, Spain. April 21, 2006.
52. Tissue engineered trachea. *Annual meeting of the Japanese Society of Chest Surgery*. Tokyo, Japan. May 25-27, 2006.
53. The actual status of the artificial lung. *2nd General Thoracic Surgery Course*. Bursa, Turkey. June 15-17, 2006.
54. Trachea surgery in children. *2nd General Thoracic Surgery Course*. Bursa, Turkey, June 15-17, 2006.
55. Limits of airway surgery. *2nd General Thoracic Surgery Course*. Bursa, Turkey, June 15-17, 2006.
56. Utilización de trasplante de vasos cadavéricos en el tratamiento quirúrgico de los tumores intratorácicos. *III Congreso Oncológico para Profesionales Sanitarios*. Benavente, Spain, October 20-21, 2006.

57. Tratamiento quirúrgico de la hipertensión arterial pulmonar. Hipertensión Pulmonar. *IV Curso práctico de actualización cardiovascular*. Barcelona, Spain. November 2-3, 2006.
58. Tumor primitivi della via aerea superiore. *XI Sessione. NSCLC-Terapia Chirurgia. Congresso Oncologia Toracica. Lo stato dell'arte alla fine del 2006*. Bari, Italy, November 30 – December 2, 2006.
59. État actuel de la chirurgie trachéal. *Congreso de la Société Marocaine des Maladies Respiratoires*. Fez, Morocco, March 2-4, 2007.
60. Cirugía de los tumores T4. *Congreso de la Société Marocaine des Maladies Respiratoires*. Fez, Morocco, March 2-4, 2007.
61. Rare tumors: Chest wall tumors. *ESMO International Symposium (EIS) of Chest Tumors*. Geneva, Switzerland, March 30 – April 1, 2007.
62. Cirugía de los tumores de pancoast. Mesa de Cirugía I: Recursos Técnicos en Cirugía Torácica. *Congreso Sociedad Madrileña de Neumología y Cirugía Torácica*. Madrid, Spain. April 12-13, 2007.
63. Resección de la carina traqueal: planteamiento teórico. *Curso de Actualización en Técnicas Quirúrgicas Torácicas*. Salamanca, Spain, May 29-30, 2007.
64. Resección y reconstrucción de la vena cava superior. Enfermedad Vascular Pulmonar. *Curso FMC-SEPAR*. Castelldefels, Spain. October 5-6, 2007.
65. Resección de Carina. *Programa Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia. October 11-14, 2007.
66. Avances en cirugía de tráquea. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia. October 11-14, 2007.
67. Implante de vasos cadavéricos en cirugía de tórax. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia, October 11-14, 2007.
68. Tratamiento quirúrgico del htp por TEP recurrente. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia. October 11-14, 2007.
69. Novalung: Asistencia pulmonar. *Simposio Cirugía de Torax Camilo Schrader Fajardo. Instituto Nacional de Cancerologia*. Medellín, Colombia. October 11-14, 2007.
70. Manejo quirúrgico de las estenosis subglóticas benignas y malignas en niños y adultos. *XXIX Curso Internacional de la SMORL y CCC (Sociedad*

Mexicana de Otorrinolaringología y Cirugía de la Cabeza y Cuello). México D.F., México. February 14-16, 2008.

71. Traqueotomía mediastinal, indicaciones y técnica quirúrgica. *XXIX Curso Internacional de la SMORL y CCC (Sociedad Mexicana de Otorrinolaringología y Cirugía de la Cabeza y Cuello)*. Ciudad de México, México. February 14-16, 2008.
72. Conferencia Magistral: Estado actual y futuro del tratamiento de la estenosis laringotraqueal (Transplante, biología molecular, inmunología e ingeniería de tejidos de la vía aérea). *XXIX Curso Internacional de la SMORL y CCC (Sociedad Mexicana de Otorrinolaringología y Cirugía de la Cabeza y Cuello)*. México D.F., México. February 14-16, 2008.
73. Conferencia Inagural: Asistencia Ventilatoria Extracorporal. *Ier Seminario Cuidados Respiratorios*. Ciudad Real, Spain. February 27-29, 2008.
74. The technological improvements in Thoracic Surgery practice. *11th Annual Congress of the Turkish Thoracic Society*. Belek-Antalya, Turkey. April 23-27, 2008.
75. Carina involvement and the management of satellite nodule. *11th Annual Congress of the Turkish Thoracic Society*. Belek-Antalya, Turkey. April 23-27, 2008.
76. Traumatismos torácicos. Módulo de Atención al Paciente Politraumatizado Grave. *Master Críticos. Universidad de Barcelona*. Barcelona, Spain. May 21, 2008.
77. Presentación teórica: Cómo lo hago. Abordaje transpericárdico de la carina traqueal. *II Curso Avanzado de Cirugía Torácica. Hospital Universitario de Salamanca*. Salamanca, Spain. June 16-18, 2008.
78. Sistema de intercambio de gases extracorporales. *Módulo de Patología de Alta complejidad. Master de Medicina Respiratoria*. Universidad de Barcelona. Sede de la Sociedad Española de Neumología y Cirugía Torácica (SEPAR), Barcelona, Spain. June 21, 2008.
79. Soporte respiratorio extra-corporal. *XV Curso de actualización en cuidados intensivos respiratorios para enfermería*. Hospital Clínic - Universidad de Barcelona. Barcelona, Spain. October 13-17, 2008.
80. Soporte extracorporeo para la insuficiencia respiratoria aguda. *VI Simposio Asociación Colombiana de Medicina Crítica y Cuidado Intensivo*. Santiago de Cali, Colombia. November 6-8, 2008.
81. Soporte extracorporeo como puente al transplante pulmonar. *VI Simposio Asociación Colombiana de Medicina Crítica y Cuidado Intensivo*. Santiago de Cali, Colombia. November 6-8, 2008.

82. Tissue engineering in Chirurgia Toracica: quo vadis. II Sessione Nuove Tecnologie in Endoscoia e Chirurgia Toracica. *Congresso Nuove Tecniche e Nuove Tecnologie in Patologia Toracica*. Barletta, Italy. December 5-6, 2008.
83. Thoraxchirurgie. *Stadienadaptierte Standards in der Thoraxchirurgie. Hannover Meeting*, Hannover, Germany. January 16-17, 2009.
84. Bionic Airways Surgery. *The Royal Society of Medicine*. London, UK. January 21, 2009.
85. Transplantament pulmó. *Master Transplantament d'Organs*. Universitat de Barcelona, Facultat de Medicina, Barcelona, Spain. February 9, 2009.
86. Patología de la tráquea. *V Symposium Internacional "Neumología Siglo XXI"*. Madrid, Spain. February 26, 2009.
87. ¿Qué ha cambiado en cirugía torácica? Células madre y pulmón: la experiencia de la tráquea. *Congreso Neumotoxa*. La Toja, Vigo, Spain. February 26-28, 2009.
88. Tracheo-bronchial transplantation. ESTS – *European Society of Thoracic Surgeons*. Elancourt, Paris, France. March 2-3, 2009.
89. Airway Transplantation. *Transplant Services Foundation (TSF)*, Barcelona, Spain. March 11, 2009.
90. Lessons learned from the first completely tissue engineered organ (the windpipe). *4th World Congress on Regenerative Medicine*. Bangkok, Thailand. March 12-14, 2009.
91. Il futuro dei trapianti clinici con tessuti ingegnerizzati. *8° Corso di formazione avanzata. Medicina Rigenerativa cellulare: realtà e prospettive*. Collegio Ghislieri, Pavia, Italy. March 20, 2009.
92. Artificial lung: quo vadis? *5th Scientific Meeting: Assist Devices-Bridge to Life*. Eugenides Foundation, Athens, Greece. March 21, 2009.
93. Tissue engineered tracheal transplantation and cell restoration: techniques, indications, and perspectives. *5th Scientific Meeting: Assist Devices-Bridge to Life*. Eugenides Foundation, Athens, Greece). March 21, 2009.
94. Tissue engineered cell restoration and replacement. *I Setmana de la Recerca*, Facultat de Medicina, Universitat de Barcelona, Barcelona, Spain. March 25, 2009.
95. Tra cardiocirurgia e Chirurgia toracica: i tumori con infiltrazione di cuore o vasi. Chi operare, come pianificare l'intervento, come operare. *Complicanze cardiovascolari in oncologia: ieri ed oggi. La gestione delle problematiche*. Napoli, Italy. March 26, 2009.

96. Bioengineering organs and tissues cell restoration. *Committee for Advance Therapies (CAT)*. European Medical Agency. London (UK), 16 April, 2009.
97. Future of Regenerative Medicine. *VI Reunión Nacional de Coordinadores de Trasplantes*. Zaragoza, Spain. April 17, 2009.
98. Tissue and cell engineering. *Annual Meeting of INFARMED Ministry of Health (Medicamentos e productos de saude: Inovacao, acessibilidade e sustentabilidade)*. Lisboa, Portugal. May 15, 2009.
99. Pulmonary Hypertension. *40th Annual congress of the Italian Association of Nonacademic Cardiologist*. Firenze, Italy. June 4-7, 2009.
100. From Bench to bedside. *The NHS Healthcare Innovation Expo*. London, UK. June 18, 2009.
101. Tissue engineering airways. *The NHS Healthcare Innovation Expo*. London, UK. June 18, 2009.
102. Airway surgery. *Convegno nazionale di pneumologia interventzionistica*. Firenze, Italy, June 19, 2009.
103. Role and fate of autologous cells in whole tissue-engineered airway replacement. *International Society for Stem Cell Reserach (ISSRS) 7th Annual Meeting*, Barcelona, Spain. July 10, 2009.
104. Translating tissue engineering into clinical transplantation: time has come. *14th Congress of the European Society Organ Transplantation*, Paris, France. August 30, 2009.
105. Putting life to science. *The knowledge triangle shaping the future of Europe*. Gothenburg, Sweden. September 1, 2009.
106. Bench to Bedside: Stem Cells Transplantation. *2nd annual Stem Cells & Regenerative Medicine Europe conference*. Edinburgh, Sweden. September 25, 2009.
107. Transplante de trachea. *XVII Congreso de la Asociacion Iberoamericana de Cirurgia Toracica*. Seville, Spain. October 1, 2009.
108. Tissue engineering as alternative to improve transplants outcome. *V Congreso de la Sociedad de Terapia genica y celular*. Granada, Spain. October 2, 2009.
109. Stem cell restoration and replacement of the airway and lungs. *Focus on Cell Therapy, Transplantation and Tissue Repair*. Bergamo, Italy, October 10, 2009.

110. Tissue engineering cell restoration and replacement. *Conference of the EACTS on advanced therapies in general thoracic surgery*. Vienna, Austria. October 21, 2009.
111. Airway tissue engineering. *World Conference in Regenerative Medicine*. Leipzig, Germany. October 30, 2009.
112. Medicina Regenerativa en Vías Respiratorias. *1st Symposium on Translational Regenerative Medicine*. Vitoria, Spain., October 31, 2009.
113. Airways and lung tissue engineering and cell repair. *19th Congress of the World Society of Cardio-Thoracic Surgeons (WSCTS)*. Buenos Aires, Argentina, November 4-6, 2009.
114. Advances in airway surgery. *19th Congress of the World Society of Cardio-Thoracic Surgeons (WSCTS)*. Buenos Aires, Argentina. November 4-6, 2009.
115. Surgery for advanced lung cancer. *19th Congress of the World Society of Cardio-Thoracic Surgeons (WSCTS)*. Buenos Aires, Argentina. November 4-6, 2009.
116. Beyond translational regenerative medicine. *Karolinska Institutet*. Stockholm, Sweden, November 12, 2009.
117. Bionic tissue engineering. *2nd Annual Commercial Translation of Regenerative Medicine*. London, UK. December 3-4, 2009.
118. Bionic airway engineering and lung restoration. *First International Conference in Regenerative Surgery*. Rome, Italy, December 10, 2009.
119. Advanced surgery for locally advanced non-small cell lung cancer. *Update NSCLC*. Hannover, Germany. December 12, 2009.
120. Progress and Perspectives in Regenerative Medicine. *University of Modena*. Modena, Italy. January 13, 2010.
121. Progress in airway surgery. *46th Annual Meeting of the Society of Thoracic Surgeon (Techno-College Post-graduate course)*. Fort Lauderdale, Florida, US. January 23, 2010.
122. Regenerative Medicine-principles and tasks. *Russian Royal Academy of Science*, Moscow, Russia. February 19, 2010.
123. Novel Approaches to Whole Organ Tissue Engineering. *Nanomedicine: Visions for the Future*, Amsterdam, Netherlands. February 25, 2010.
124. Tracheobronchial transplantation. *Turkish Society of Pneumology and Thoracic Surgery*, Uludag (T), 14-16 March 2010.

125. The artificial lung. *Turkish Society of Pneumology and Thoracic Surgery*, Uludag, Turkey. March 14-16, 2010.
126. Tracheal Reconstruction with Tissue Engineered Airway. *90th Annual Meeting of the American Association of Thoracic Surgery (Postgraduate Course)* Toronto, Ontario, Canada. May 1-5, 2010.
127. How to translate the science to a viable medical treatment. *World stem cells and Regenerative Medicine Congress*. London, UK. May 11-13, 2010.
128. Indications and therapy of primary malignant cardiac tumors. *5th Annual Meeting of the Italian Society of Cardiology and Clinical Echography*. Ancona, Italy, May 7, 2010.
129. Clinical tissue engineering: the 1st adult stem cell grown trachea transplant. *5th International Annual Meeting of Portuguese Society for Stem Cells and Cellular Therapies (SPCE-TC)*, AvePark, Taipas-Guimarães, Portugal. May 20-21, 2010.
130. Whole organ tissue engineering transplantation. *International Society of Cell Therapy*, Philadelphia, Pennsylvania, US. May 24-26, 2010.
131. T4 NSCLC Invading the Great Vessels and Heart. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts. May 27-28, 2010.
132. Carinal resection for NSCLC. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts, US. May 27-28, 2010.
133. Current status of the artificial lung. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts., US. May 27-28, 2010.
134. Management of Benign Tracheoesophageal Fistula. *General Thoracic Surgery Harvard Medical School Course*, Boston, Massachusetts, US. May 27-28, 2010.
135. Oncologia Toracica; Cancro polmonare non a piccole cellule. Tecniche innovative nella resezione carenale. *Associazione Italiana Pneumologi Ospedalieri*. Florence, Italy. June 11-12, 2010.
136. Pediatric airway tissue engineering. *Royal Academy of Medicine*. London, UK. July 11, 2010.
137. Regenerative airway replacement. *Russian Academy of Science*. Moscow, Russia. July 21, 2010.
138. Differences between in vitro and in vivo stem cell characterization and activation for windpipe transplantation. *Seoul Symposium on Stem Cell Research*. Seoul, South Korea. August 25, 2010.

139. Stem Cell Symposium. Airway tissue engineering. *5th young European scientist meeting*. Porto, Portugal. September 24-26, 2010.
140. Airway Tissue Engineered Replacement and Cell Therapy. *5th World Congress on Preventive & Regenerative Medicine*. Hannover, Germany. October 5-7, 2010.
141. Bioengineering the airway. *University California Davis*, Sacramento, California, US. October 13, 2010.
142. Progres en ingenierie bio-tissulaire du remplacement des voies aeriennes et therapie cellulaire. *Academie Nationale de Medicine*. Paris, France. October 26, 2010.
143. Airway Transplantation. *University of Bursa*, Bursa, Turkey. November 5, 2010.
144. Surgical strategies and results in the era of the multidisciplinary approach. *XXV National Congress Italian Society for Cardiac Surgery*. Rome, Italy. November 6-9, 2010.
145. Whole-organ stem cell transplantation of the larynx. *Association for Research in Otolaryngology*. Baltimore, Maryland, US. February 22, 2011.
146. Advances in regenerative airway cell therapy and tissue engineering. *Faculty of Medicine*. Krasnodar, Russia. February 25, 2011.
147. Tissue Engineered Airway Replacement and Cell Therapy. *6th John Vane Memorial Symposium on Prostacyclin Science and Pulmonary Vascular Disease*. London, UK. March 26, 2011.
148. Decellularised Lungs. *3rd Lung Regeneration Workshop, United Kingdom National Stem Cell Network*. York, UK. March 31, 2011.
149. Research design and preparing grant proposal in thoracic surgery. *6th National Thoracic Surgery Congress*. Antalya, Turkey. April 30, 2011.
150. Tracheal Transplantation. *6th National Thoracic Surgery Congress*. Antalya, Turkey. April 30, 2011.
151. Reprogramming cells for regenerative medicine. *Euroean Science Foundation Exploratory Workshop on Developmental Origins of Chronic Lung Disease*. Feldafing, Germany. May 1, 2011.
152. Tissue engineered trachea for in vivo implantation. *American Thoracic Society International Conference*. Denver, Colorado, US. May 16, 2011.
153. Stem-cell based restoration and replacement therapies for irreversible diseases of the airway. *American Society Gene and Cell Therapy, 14th Annual Meeting*. Seattle, Washington, US. May 18, 2011.

154. Advances in airway surgery. *University of Vermont*. Burlington, Vermont, US. July 25, 2011.
155. Cell Therapy and Bioengineered Replacement of the Airways. *Stem Cells and Cell Therapies in Lung Biology and Lung Diseases*. Burlington, Vermont, US. July 27, 2011.
156. Trachea and oesophagus tissue engineering. *5th SENS Conference on Rejuvenation biotechnologies*. Cambridge, UK. September 2, 2011.
157. Airways regeneration and cell therapy. *1st Congress on Stem Cell Research*. Istanbul, Turkey. September 28, 2011.
158. Advances in airway surgery. *2011 Clifton F. Mountain distinguished lecturer thoracic & cardiovascular surgery*. MD Anderson. Houston, Texas, US. November 1, 2011.
159. Tracheal transplantation by cell and tissue engineering. *Carl –Gistav Groth Annual Lecture*, Solna Sweden. November 10, 2011.
160. Lessons learned from airway tissue engineering transplantation. Astana, Kazagstan. November 12, 2011.
161. The possibilities and advances of regenerative medicine. Experience and the future. *Russian Academy of Science*. Moscow, Russia, November 28, 2011.
162. The first human tracheobronchial transplantation using a stem cell-seeded bioartificial nanocomposite. *Scandinavian Society for Research in Cardiovascular Surgery 22nd Annual Meeting*. Geilo, Norway. February 9, 2012.
163. The First Stem-Cell Tracheal Transplant. *National Undergraduate & Foundation General Surgery Conference*. University College London, London, UK. March 4, 2012.
164. From stem cells to artificial organs. *2nd Technological Innovation Conference and Expo*. Mexico City, Mexico. March 21, 2012.
165. Tracheal-Bronchial Replacement Therapy with Stem Cells: Universal Application? *American Association for Thoracic Surgery*. San Francisco, California, US. April 29, 2012.
166. Clinical Experience with Airway Tissue Replacement. *Biologic Scaffolds for Regenerative Medicine, 7th Symposium*. Napa Valley, California, US. April 27, 2012.
167. Regenerative biotechnological treatment of life-threatening diseases of the airways. *European student conference*. Berlin, Germany. August 31, 2012.

168. Stem-cell based organ replacement and cell therapy. *World Stem Cell Summit*, West Palm Beach, Florida, US. December 3, 2012.
169. Regenerative Biotechnological Treatment. *American Association of Advance in Science*, Boston, Massachusetts, US. February 18, 2013.
170. Tracheal and Carinal Tumors: Management and Outcome. Surgery of the trachea from resection to transplantation. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 21, 2013.
171. Mediastinal Tracheostomy. Surgery of the trachea from resection to transplantation. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 21, 2013.
172. Surgery for subglottic stenosis. Surgery of the trachea from resection to transplantation. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 21, 2013.
173. Biotransplantation of the trachea. Saudi Group of Thoracic Surgery and Saudi Thoracic Society. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 22, 2013.
174. Stem Cell Therapy for Necrotic Upper Airway. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 22, 2013.
175. Stem Cell Identification of Tracheal Carcinoma. *Saudi Group of Thoracic Surgery and Saudi Thoracic Society*. Riyadh, Kingdom of Saudi Arabia. February 22, 2013.
176. Regenerative medicine: implications for transplantation and cancer therapy. *Surgical Grand Round, University of Illinois College of Medicine at Peoria Department of Surgery*. Peoria, Illinois, US. April 5, 2013.
177. Stem cell treatment in ARDS. *2nd EuroELSO Congress*. Stockholm, Sweden. May 9, 2013.
178. Transplantable Scaffolds For The Lung. *American Thoracic Society*, Philadelphia, Pennsylvania, US. May 17-22, 2013.
179. Interaction Between Mesenchymal Stromal Cells, Bioengineered Tissues and Organs & Human body. *International Society for Stem Cell Research*, Florence, Italy, September 17, 2013.
180. Cell-Scaffold Interactions in Clinical Tissue Engineering Transplantation. *3rd Cell Society*, San Diego, California, US. September 19, 2013.
181. From research to clinical application using stem cells. *Medicinteknikdagarna (MTD)*, Stockholm, Sweden. October 2, 2013.

182. Clinical cell-matrix Interactions. *World Conference of Regenerative Medicine*. Leipzig, Germany. October 24, 2013.
183. Update on bioengineering organs and cell therapy. *Open Innovation Forum*. Moscow, Russia. November 1, 2013.
184. Invited Speaker. Lost in Translation- Clinical Developments. *4th Berlin-Brandenburg School for Regenerative Therapies PhD Symposium*. Berlin, Germany. December 6, 2013.
185. Regenerative Medicine. *University of Illinois at Urbana-Champaign, Department of Surgery*. Urbana, Illinois. December, 23, 2013.
186. Progress in Clinical Thoracic Tissue Engineering and Cell Therapy. *Texas Heart Institute*, Houston, Texas. January 9, 2014.
187. Current State of Regenerative Medicine. *University of Illinois at Urbana-Champaign, College of Bioengineering*. Feb. 12, 2014.
188. Current State of Regenerative Medicine. *International Stem Cell Society*. Freeport, Bahamas. Feb 20, 2014.
189. Clinical applications for Tissue Engineered Intrathoracic Organs. *Third International Genetics of Aging and Longevity Conference*, Moscow Russia, April 9, 2014.
190. The development of tissue engineered organs. *X International Symposium of Biomedical Engineering*. Monterey City, Mexico, April 24, 2014.
191. Innovations in airway surgery: tracheal replacement and beyond *American Association for Thoracic Surgery*, Toronto, Ontario, Canada, April 26, 2014.
192. Medical Innovation. *International conference on intellectual property and health innovation. Challenges for the future. World Intellectual Property Organization*. Athens, Greece, April 28, 2014.

5 DEVELOPMENT WORK IN TEACHING/MEDICAL PEDAGOGY

5.1 Pedagogical development work and projects

- Faculty Member, European School for Cardiothoracic Surgery: General Thoracic Surgery and post-operative management of thoracic surgery patients;
- Chairman, Research and Research Funding, European Association Cardio-thoracic Surgery (EACTS);
- Scientific Council on Pulmonary Transplantation, International Society of Heart-Lung Transplantation;
- European Union Liaison, Post-graduate Education, Young Investigator Awards, EACTS;

- Surgical Treatment of End-Stage, Cardiopulmonary Disease Committee, Society of Thoracic Surgeons
- Member of the annual medical student educational program for Thoracic Surgery (Medizinische Hochschule Hannover, Germany): planning, designing and practical and oral examinations and clinical training

5.2 Communication and presentations of pedagogical development work

Not applicable

6 TEACHING DISTINCTIONS

Not applicable

7 OTHER TEACHING MERITS

Not applicable

8 CONCRETE EXAMPLES AND REFLECTIONS ON YOUR OWN TEACHING

To me, the most important reflection of my teaching activity is that almost all of my previous research and medical students and fellows are frequently in contact with me for advice and to discuss both scientific and clinical issues. 9 out of 12 fellows in general thoracic surgery have become chief or leading position of thoracic/cardiac surgery in Germany, Japan and Spain.

- Prof. T. Walles: Chief of the Department of Thoracic Surgery, University of Würzburg, Germany
- Prof. C. Hagl: Chief of the Department of Cardiac Surgery, University Hospital Großhadern, University of München, Germany
- Dr. M. Richter: Head of the Thoracic Surgery Division, Klinikum Braunschweig, Teaching Hospital of the Medical University of Hannover, Germany
- Dr. P. Zardo: Head of the Thoracic Surgery Division, University of Magdeburg, Germany
- Dr. Matthias M. Altmayer: Senior Consultant at the Department of Thoracic Surgery, Klinikum Region Hannover, Oststadt-Heidehaus, Hannover, Germany
- Dr. T. Go: Head of Tracheal Surgery at the Department of General Thoracic Surgery, Kagawa University, Japan
- Dr. M Jaus: Head of the Thoracic Surgery, Pertini Hospital, Rome
- Dr. A. Gonfiotti: Senior Consultant at the Division of Thoracic Surgery, Careggi University Hospital, Italy
- Dr. Elisabeth Martínez Téllez: Senior Consultant at the Department of Thoracic Surgery, University Hospital de la Santa Creu i Sant Pau, Barcelona, Spain
- Dr. Sanchez: Consultant at the Department of Thoracic Surgery, Hospital Clinic, University Hospital Barcelona, Spain
- Dr. Manoli Sanchez-Iglesias: Senior Consultant at the Division of Thoracic Surgery, Hospital Parc tauli de Sabadell, Spain

KAROLINSKA INSTITUTET

CLINICAL PORTFOLIO

1 CLINICAL SPECIALIST EXPERTISE AND CURRENT ACTIVITY

10/2011 – present Consultant, Airway Transplantation, Kuban State Medical University, Krasnodar, Russia

Area of expertise: complex airway and thoracic surgery

2 CLINICAL EXPERTISE AND FORMAL TRAINING (INCLUDING PUBLIC HEALTH WORK)

2.1 Completed clinical training

MD University of Pisa, Pisa, Italy 1980-1986

MCh University of Pisa, Pisa, Italy 1986-1991

Resident, Service of Thoracic Surgery,
University of Pisa, Pisa, Italy 1986-1989

Fellow, Dept. of Thoracic Surgery,
University of Alabama at Birmingham, Birmingham,
Alabama, USA 1990-1991

Specialisation in Organ and Tissue Transplantation.
University of Franche-Cômpte, Beçanson, France 1991-1993

Fellow, Dept. of Thoracic & Vascular Surgery
and Heart-Lung Transplantation, Hôpital Marie-Lannelongue,
Paris-Sud University, Le Plessis Robinson, France 1992-1995

Specialisation in Thoracic Surgery. Medical Council
Low Saxony, Hannover, Germany, 2000

2.2 Specialist expertise

See above

- 24 years as general surgeon
- 21 years as transplant surgeon
- 19 years as general thoracic surgeon

2.3 Clinical positions

8/1995 - 3/1999 Consultant Surgeon, Dept. of Thoracic and Vascular Surgery and Heart-Lung Transplantation, Hôpital Marie-Lannelongue, Paris-Sud University, Le Plessis Robinson, France

4/1999 - 12/2004 Head and Chairman,
Department of General Thoracic and Vascular Surgery,

Heidehaus Hospital, Hannover Medical School,
Hannover, Germany

1/2005 - 12/2009 Senior Consultant and Chairman, Department of General Thoracic Surgery, Hospital Clinic, University of Barcelona, Barcelona, Spain

1/2010 – 9/2012 Director, European Center for Thoracic Research (CERT), University Hospital Careggi, Florence, Italy

Director, BIOAIRlab (Laboratory of Bioengineering & Molecular Airways), University Hospital Careggi, Florence, Italy

12/2010 – 12/2013 Consultant, Department Clinical Sciences, Intervention & Technology, Division of Ear, Nose & Throat Diseases, Karolinska University Hospital, Stockholm, Sweden

10/2011 – present Consultant, Airway Transplantation, Kuban State Medical University, Krasnodar, Russia

12/2010 – present Director, Advanced Center for Translational Regenerative Medicine (ACTREM), Karolinska Institutet, Stockholm, Sweden

Director, European Airway Institute, Karolinska Institutet, Stockholm, Sweden

10/2011 – present Director of International Research, Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russia

2.4 Clinical supervisory positions

4/1999 –12/2004 Head and Chairman,
Department of General Thoracic and Vascular Surgery,
Heidehaus Hospital, Hannover Medical School,
Hannover, Germany

1/2005 –12/2009 Senior Consultant and Chairman, Department of General Thoracic Surgery, Hospital Clinic, University of Barcelona, Barcelona, Spain

1/2010 – 9/2012 Director, European Center for Thoracic Research (CERT), University Hospital Careggi, Florence, Italy

Director, BIOAIRlab (Laboratory of Bioengineering & Molecular airways), University Hospital Careggi, Florence, Italy

- 12/2010 – present Director, Advanced Center for Translational Regenerative Medicine (ACTREM), Karolinska Institutet, Stockholm, Sweden
- Director, European Airway Institute, Karolinska Institutet, Stockholm, Sweden
- 10/2011 – present Director of International Research, Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russia

2.5 On-call activity

- 08/1995 – 03/1999 On-call and standby duty as Consultant, Department of Thoracic and Vascular Surgery and Heart-Lung Transplantation, Hôpital Marie- Lannelongue, Paris-Sud University, Le Plessis Robinson (France)
- 04/1999 – 12/2004 On-call as Chairman, Department of General Thoracic and Vascular Surgery, Heidehaus Hospital, Hannover Medical School, Hannover (Germany)
- 01/2005 – 12/2009 On-call as Chairman and Senior Consultant, Department of General Thoracic Surgery Hospital Clinic, University of Barcelona, Barcelona (Spain)
- 1/2011 – 12/2013 Consultant at the Karolinska University Hospital, .

2.6 Clinical profile area

- Adult and Pediatric Tracheal Surgery;
- Complex Surgery of Lung, Esophageal, and Mediastinal Tumors;
- Airway and Lung Transplantation;
- Surgical therapy for end-stage lung diseases including pulmonary endarterectomy, lung volume reduction surgery and regional lung perfusion;
- (Bio)Artificial Lung;
- Stem cells treatment and tissue engineering replacement for respiratory diseases

2.7 Assignments

- Surgical Treatment of End-Stage, Cardiopulmonary Disease Committee, Society of Thoracic Surgeons, USA (2008-2012)
- DFG (Deutsche Forschungsgemeinschaft, Germany). Domain: Organ and Tissue Transplantation (2002-2006)
- Wellcome Trust (UK). Domain: Regenerative Medicine (2008-present)
- Italian Association for Research in Cancer (Italy). Domain: Experimental cancer research (2007-2008)
- EU evaluator FP7 (EU, Brussels). Domain: Regenerative medicine and organ transplantation (2010-2013)
- EMEA (European Medical Agency). Domain: Stem cell and tissue engineering for end-stage lung diseases (since 2009)
- ASPEN Institute Italia, Milan, Italy (since 2009)

- European Postgraduate school of Cardiothoracic surgery
- Clinical Advisory Board, Technology and Innovation Center - <http://www.innovateuk.org/content/news/new-cell-therapy-technology-and-innovation-centre.ashx>)
- Clinical Advisory Board, Technology Strategy Board (UK funding agency for industry) - <http://www.innovateuk.org/>

3 CLINICAL DEVELOPMENT WORK (INCLUDING PUBLIC HEALTH)

3.1 Efforts resulting in significantly improved clinical care provision

Advances in neo-adjuvant treatment for non small cell cancer

- First evidence of the relations between neovascularization and metastasis in non small cell lung cancer;
- Technical advances of pulmonary thromboendarterectomy for chronic pulmonary hypertension;
- Technical advances of surgery for subglottic tracheal stenosis and trachea- esophageal fistula;
- Technical advances in complex tracheobronchial reconstruction in pediatric and adult patients;
- Development of awake airway surgery;
- Development of the T, N, and M staging system for primary tracheal malignancies;
- Development of extracorporeal pumpless artificial lung and first clinical elective implantations in patients with post-surgical acute respiratory distress syndromes;
- Performed the first clinical implantation of a tissue engineered airway patch;
- Performed the first clinical transplantation of tissue engineered natural airway;
- Performed the first clinical transplantation of a tissue engineered natural airway on pediatric patient;
- Performed the first clinical transplantation of a tissue engineered natural airway on oncological patients;
- Performed the first clinical transplantation of a tissue engineered synthetic airway;

3.2 Area of expert knowledge

- Adult and Pediatric Tracheal Surgery;
- Complex Surgery of Lung, Esophageal, and Mediastinal Tumors;
- Airway and Lung Transplantation;
- Surgical therapy for end-stage lung diseases including pulmonary endarterectomy, lung volume reduction surgery and regional lung perfusion;
- (Bio)Artificial Lung;
- Stem cells treatment and tissue engineering replacement for respiratory diseases

3.3. Responsibility for a diagnostic group

As Director of the Advanced Center for Translational Regenerative Medicine (ACTREM- Karolinska Institutet, Stockholm, Sweden), Director of the European Airway Institute (Karolinska Institutet, Stockholm, Sweden) and Director of International Research, Clinical and Educational Center of Regenerative Medicine (Kuban State Medical University, Krasnodar, Russia), coordination of international patients was the majority of referrals. All clinical trial patients are entered into a standardized database.

3.4 New treatment forms and diagnostics

- Advances in neo-adjuvant treatment for non small cell cancer
- First evidence of the relations between neovascularization and metastasis in non small cell lung cancer;
- Technical advances of pulmonary thromboendarterectomy for chronic pulmonary hypertension;
- Technical advances of surgery for subglottic tracheal stenosis and trachea- esophageal fistula;
- Technical advances in complex tracheobronchial reconstruction in pediatric and adult patients;
- Development of awake airway surgery;
- Development of the T, N, and M staging system for primary tracheal malignancies;
- Development of extracorporeal pumpless artificial lung and first clinical elective implantations in patients with post-surgical acute respiratory distress syndromes;
- Performed the first clinical implantation of a tissue engineered airway patch;
- Performed the first clinical transplantation of tissue engineered natural airway;
- Performed the first clinical transplantation of a tissue engineered natural airway on pediatric patient;
- Performed the first clinical transplantation of a tissue engineered natural airway on oncological patients;
- Performed the first clinical transplantation of a tissue engineered synthetic airway;
- Successfully implanted the world's first bio-artificial trachea using a lab-made nanocomposite graft
- Performed the first human tissue engineered laryngo-tracheal transplantation
- Performed th first bio-artificial tracheal using a lab-made nanocomposite graft in a child
- Reported the first long term outcomes of tissue engineered tracheal transplants in humans

3.5 Clinical trials

<https://clinicaltrials.gov/ct2/show/NCT01997437?term=macchiarini&rank=1>

Primary Investigator; Laryngo-Tracheal Tissue-Engineered Clinical Transplantation at Kuban State Medical University in Krasnodar, Russia
A Phase II trial began in June 2013

3.6 Care programme and clinical guidelines

During my office as Chairman of Departments, the annual health- programme (financial budget, type of care, *etc.*) was yearly discussed and programmed and monthly monitored with the Hospital administrative authorities first and then with the national Insurance companies (Germany) and National Health System (Spain).

3.7 Clinical supervision

- 03/2005-12/2009 Director, Post-graduate program of general thoracic surgery (Residents and Fellows), Hospital Clínic, University of Barcelona, Barcelona (Spain)
- 04/2000-12/2004 Director, Post-graduate (Residents & Fellows) program of general thoracic surgery, Heidehaus Hospital, Hannover Medical School, Hannover (Germany)

3.8 Pharmaceuticals

- “Advanced Therapy” committees for stem cell-based therapy for the European Medical Agency, London (UK)

3.9 Clinical use of results achieved in a specific medical field

- First evidence of the relations between neovascularization and metastasis in non small cell lung cancer;
- Technical advances of pulmonary thromboendarterectomy for chronic pulmonary hypertension;
- Technical advances of surgery for subglottic tracheal stenosis and trachea-esophageal fistula;
- Technical advances in complex tracheobronchial reconstruction in pediatric and adult patients;
- Development of awake airway surgery;
- Development of the T, N, and M staging system for primary tracheal malignancies;
- Development of extracorporeal pumpless artificial lung and first clinical elective implantations in patients with post-surgical acute respiratory distress syndromes;
- Performed the first clinical implantation of a tissue engineered airway patch;
- Performed the first clinical transplantation of tissue engineered natural airway;
- Performed the first clinical transplantation of a tissue engineered natural airway on pediatric patient;
- Performed the first clinical transplantation of a tissue engineered natural airway on oncological patients;
- Performed the first clinical transplantation of a tissue engineered synthetic airway; 2008
- Successfully implanted the world’s first bio-artificial trachea using a lab-made nanocomposite graft
- Performed the first human tissue engineered laryngo-tracheal transplantation
- Performed th first bio-artificial tracheal using a lab-made nanocomposite graft in a child

- Reported the first long term outcomes of tissue engineered tracheal transplants in humans

3.10 Clinical fellowship

Regular auditing of courses was an essential duty as Director of Post-graduate Program of General Thoracic Surgery, Hospital Clínic (Universitat de Barcelona, Barcelona, Spain) and Director of the Post-graduate (Residents & Fellows) Program of General Thoracic Surgery (Hannover Medical School, Hannover, Germany) and Lead Scientist / Coordinator of the Russian Megagrant (<http://www.regmedgrant.com/index.php?id=4&lang=eng>).

3.11 Preventive work

Not applicable

4 CLINICAL DISTINCTIONS

1987-1989	Italian Association for the Biological, Epidemiological, Clinical and Therapeutical Research in Medical Sciences Fellowship Award
1989-1990	International University of Alabama at Birmingham Fellowship Award
1990	European Communities Oncology Fellowship Award
2013	Named one of the “Top 20 most innovative surgeons alive today” (no. 19) http://www.healthcare-administration-degree.net/20-most-innovative-surgeons-alive-today/

5 OTHER CLINICAL MERITS

1993-1996	Fondation d' Avenir Award
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6 DEVELOPMENT PLANS IN HEALTHCARE AND PUBLIC HEALTH

Ideally to establish a Thoracic and Airway Surgery Unit focused on complete interdisciplinary pre-operative, intra-operative and post-operative care of the thoracic patient. This unit will perform gold standard surgical procedures in accordance with the most up-to-date thoracic surgery principles, offer the highest standard of care in the field of translational (bench to bedside) medicine principles, collaborate with local academic medical institutions to teach medical students and surgical residents how to provide complex surgical subspecialty care in an interdisciplinary model, and perform internationally collaborative research in thoracic and airway surgery, regenerative medicine and intra-thoracic transplantation.

KAROLINSKA INSTITUTET

LEADERSHIP, DEVELOPMENT AND COLLABORATION PORTFOLIO

1 CURRENT ACTIVITIES INVOLVING MANAGERIAL RESPONSIBILITY

- 11/2011 - present Full Professor, Kuban State Medical University,
Krasnodar, Russia
- 12/2010 – present Director, Advanced Center for Translational
Regenerative Medicine (ACTREM), Karolinska
Institutet, Stockholm, Sweden
- Director, European Airway Institute, Karolinska
Institutet, Stockholm, Sweden
- 10/2011 – present Director of International Research, Clinical and
Educational Center of Regenerative Medicine, Kuban
State Medical University, Krasnodar, Russia

2 TRAINING IN LEADERSHIP, DEVELOPMENT AND COLLABORATION

2.1 Formal education and degrees

- MS Masters in Biostatistics, University of Alabama, Birmingham,
Alabama, USA 1990-1991

2.2 Completed courses/study programmes

- Web course for Supervisors, Karolinska Institutet, Stockholm, Sweden

3 MANAGERIAL POSITIONS

3.1 Chairmanship

Chairman, academic board:

- Research and Research Funding, European Association Cardio- thoracic Surgery (EACTS)
- Surgical infection disease, Hannover Medical School
- Equal Opportunities, Hannover Medical School

Chairman, recruitment board:

- Recruitment of chairman of pneumology, Hannover medical School, 2003: Prof. Welte T
- Recruitment of chairman of pneumology, Heidehaus Hospital, Hannover Medical School, 2004: Prof. Schoenhofer B
- Recruitment of professor and chairman at the Department of Cardiac Surgery of the Hospital Clinic, University of Barcellona: Prof. Pomar JL

International projects leader:

- Director, European Airway Institute, Division of ENT (CLINTEC), University Hospital Huddinge, Sweden
- Director, Advanced Center for Translational Regenerative Medicine (ACTREM), Karolinska Institutet, Stockholm, Sweden
- Consultant/Director, Airway Transplantation, Kuban State Medical University, Krasnodar, Russia Federation

3.2 Positions as member or delegate

1987 - present	European Association for Cancer Research
1988 - present	European Society of Surgical Oncology
1989 - present	International Association for the Study of Lung Cancer
1995 - present	American Society of Clinical Oncology
1995 - present	Metastasis Research Society
1995 - present	American Association of Cancer Research
1996 - present	European Association of CardioThoracic Surgery
1997 - present	International Society of Heart-Lung Transplantation
1998 - present	French Society of Cardiothoracic Surgery
1999 - present	Society of Thoracic Surgeons
1999 - present	American Association of Transplant Physician
2000 - present	American College of Surgeons Oncology Group
2000 - present	European Society of Thoracic Surgery
2000 - present	German Society of Thoracic and Cardiovascular Surgery
2004 - present	American Association of Thoracic Surgery
2006 - present	Spanish Society of Cardiothoracic Surgery
2007 - present	International Association for Artificial Organs
2010 - present	Fleishner Society

3.3 Responsibility for a section, course coordinator, director of studies, responsibility for a study programme

Programme director:

01/2000 - 12/2004	Post-graduate (Residents and Fellows) program of general thoracic surgery (http://www.aekn.de). Hannover medical School, Hannover, (Germany).
01/2005 - 12/2009	Post-graduate (Residents and Fellows) program of general thoracic surgery (http://www.separ.es/separ-mir/programa_formacion.html). Hospital Clinico de Barcellona, Faculty of Medicine, University of Barcelona, Barcelona (Spain).

Head of Department:

1/2005 - 12/2009	Department of General Thoracic Surgery Hospital Clinic, University of Barcelona, Barcelona (Spain).
1/2003 - 12/2004	Medical Director, Heidehaus Hospital, Hannover Medical School, Hannover (Germany).
4/1999 - 12/2004	Department of General Thoracic and Vascular Surgery, HeidehausHospital, Hannover Medical School, Hannover (Germany).

Congress organiser (number and type)

- Principles of mechanical ventilation and aponoic oxygenation. Hannover, Germany, March 15, 2001.
- Surgical Therapies of the Bronchial Carcinoma, therapy and diagnostic. Hannover, Germany, March 15, 2003.
- Lung Cancer. Cancer information day: “*Der Mensch im Mittelpunkt*”.Oncological Circle Hannover. Hannover (D). March 22, 2003.
- Diagnosis and treatment of mediastinal tumors. Hannover, Germany, March 16, 2004.
- Current status of extracorporeal lung assiste devices. University of Barcellona, Barcellona, Spain. April 4, 2006
- Surgical approach to pulmonary hypertension. . University of Barcellona, Barcellona, Spain. June 7, 2007
- Regenerative approached to diseases of the respiratory system. University of Barcellona, Barcellona, Spain. January 12, 2009

3.4 Research team leadership

See all grants above

1/2010 – 9/2012	Director, European Center for Thoracic Research (CERT), University Hospital Careggi, Florence, Italy
	Director, BIOAIRlab (Laboratory of Bioengineering & Molecular Airways), University Hospital Careggi, Florence, Italy
10/2011 – present	Director of International Research, Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russia

4 COMMITTEE WORK, ETC.

4.1 Commissions of trust in academic organisations

Not applicable

4.2 Student union activity

Not applicable

4.3 Trade union activity

Not applicable

4.4 Other committee work

1. Chairman, Research and Research Funding, European Association Cardiothoracic Surgery (EACTS)
2. Scientific Council on Pulmonary Transplantation, International Society of Heart-Lung Transplantation
3. European Union Liaison, EACTS
4. Post-graduate Education, EACTS
5. Young Investigator Awards, EACTS
6. General Thoracic Biology Club, AATS
7. Hans Borst Award Committee, EACTS

8. Surgical Treatment of End-Stage, Cardiopulmonary Disease Committee, Society of Thoracic Surgeons (STS)
9. MRC Clinical Research Training Fellowship (Grant Pre-award Committee)
10. Swiss National Research Foundation
11. European Union FP7, Grant Evaluation Committee
12. European Union, Bioartificial organ and tissue Committee
13. New Organ Alliance Advisory Board
14. Peer review Great Ormond Street Hospital Children's Charity (2013-CRSG-37)
15. Swiss National Science Foundation (SNSF, CHE)
16. Medical Research Council (UK)
17. Collaboration with authorities and positions of trust.
18. DFG (Deutsche Forschungsgemeinschaft, Germany). Domain: Organ and Tissue Transplantation (2002-2006)
19. Wellcome Trust (UK). Domain: Regenerative Medicine (2008-present)
20. Italian Association for Research in Cancer (Italy). Domain: Experimental cancer research (2007-2008)
21. EU evaluator FP7 (EU, Brussels). Domain: Regenerative medicine and organ transplantation (2010-2013)
22. EMEA (European Medical Agency). Domain: Stem cell and tissue engineering for end-stage lung diseases (since 2009)
23. ASPEN Institute Italia, Milan, Italy (since 2009)
24. European postgraduate school of Cardiothoracic surgery
25. Clinical Advisory Board, Technology and Innovation Center (<http://www.innovateuk.org/content/news/new-cell-therapy-technology-and-innovation-centre.ashx>)
26. Clinical Advisory Board, Technology Strategy Board (UK funding agency for industry) - <http://www.innovateuk.org/>

5 DEVELOPMENT WORK AT EDUCATIONAL INSTITUTIONS OR HOSPITALS

International Scientific-Research Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russian Federation. Since October 2011

This center has been created after approval in October 2011 by the Russian Ministry of Education and Science and aims to promote excellence of research in the fields of airway and general thoracic and regenerative surgeries and intrathoracic biotransplantation. Funded by the Megagrant of the Russian Ministry of Education and Science (agreement No.

11.G34.31.0065), it is composed of a Director that coordinates the scientific committee to raise and supervise research projects in the different fields of the above domains, educate young doctoral and post-doctoral candidates at national and international level, and provide guidelines for the most cutting-edges therapies in the clinical fields of the above clinical sciences.

<http://www.regmedgrant.com/index.php?id=4&lang=eng>

European Airway Institute (EAI), Division of ENT (CLINTEC), University Hospital Huddinge, Sweden. Since September 2011.

This Institute has been established as an international Centre of Excellence dedicated to patient care, research, training and education in the field of complex disorders of the larynx, trachea and bronchus. The intention is to promote better care through a close, collaborative network. In this way, a unique world-class referral centre for this neglected and difficult-to-treat group of patients will be formed, a new range of treatments will be pioneered and the next generation of dedicated healthcare professionals in this field will be trained. Dr. Macchiarini has been appointed as the Director of the EAI with the task of organizing and structuring the Institute, and providing a research and clinical platform for airways of the respiratory system.

Advanced Center for Translational Regenerative Medicine (ACTREM), Division of ENT (CLINTEC), Stockholm, Sweden Since September 2011.

ACTREM was launched at the Karolinska Institutet in 2011 as a resource dedicated to the understanding and development and subsequent clinical transfer of novel therapies to regenerate damaged tissues and organs using cell therapy and tissue engineering approaches. Emphasis is given on the training and education of young academics in the field of translational regenerative medicine. Through association with the Karolinska Institutet, ACTREM is well positioned at the center of a consortium of world-class scientists and clinicians with diverse areas of expertise and a worldwide network of expert collaborators. Dr. Macchiarini has been appointed recently Director of the ACTREM with the task of raising funds and bringing together an interdisciplinary consortium including bioengineering, mathematical modeling, cell engraftment strategies, scaffold development, cell therapy *ex vivo*, *in vitro*, and *in vivo* models, and pharmacological regenerative approaches, able to enhance existing methodologies and develop new techniques for regenerative medicine therapies. <http://ki.se/en/clintec/actrem>

6 ETHICS, EQUAL TREATMENT, AND ENVIRONMENTAL CONSIDERATION

Taylor DA, Caplan AL, Macchiarini P. Ethics of bioengineering organs and tissues. *Expert Opin Biol Ther*. 2014 May 3 [Epub ahead of print]. (IF: 3.345)

7 MANAGEMENT AND COLLABORATION

7.1 Supervisory responsibility

Supervisor of Doctoral program:

Karsten Kuhn. Title: *Evaluierung der transkardiopulmonalen Einzelindikator-Thermodilution nach Lungenresektionen wegen nichtkleinzelligem Bronchialkarzinom unter besonderer Berücksichtigung der Lymphadenektomie*. Medizinische Hochschule Hannover. Hannover, Germany. 2005

Christian Biancosino. Title: *Generation of a bioartificial fibromuscular tissue with autoregenerative capacities for surgical reconstruction*. Medizinische Hochschule

Hannover. Hannover, Germany. 2006

Eike Nicke and Lars-Oliver Jasper. Title: *Perioperative Antibiotikaprophylaxe in der elektiven Lungenchirurgie: prospektive Anwendungsbeobachtung mit "single-shot" Rocephin und retrospektive Kontrollanalyse zweier prolongierter Prophylaxe-Regime mit Augmentan und Unacid; klinische Wirksamkeit und Kosteneffizienz*. Medizinische Hochschule Hannover. Hannover, Germany. 2008

Nina Stadtler. Title: *Prospektive Analyse der sophagusfunktion nach Pneumonektomie*. Medizinische Hochschule Hannover. Hannover, Germany. 2010

Philipp Jungebluth. Title: *A potential approach for tracheal reconstruction: biotissue engineering of a tracheal tubular graft*. Medizinische Hochschule Hannover. Hannover, Germany. 2010.

Leonardo Polizzi. Title: *Tracheal transplant and tissue engineering*. Faculty of Medicine at the University of Florence. Florence, Italy. 2010

Johannes Haag. Title: *Improved biomechanics of tracheal natural scaffolds using cross-ling proteins*. Medizinische Hochschule Hannover. Hannover, Germany. 2012.

Jafar Jorjani. Title: *Interrelation between intensive care patients and general thoracic surgery*. Medizinische Hochschule Hannover. Hannover, Germany. 2012.

Sebastian Sjoqvist. Title: *Tissue engineering and stem cell therapy for esophageal disorders*. Clinical Scientist Training Programme (CSTP) Karolinska Institutet. Stockholm, Sweden (*to be presented*)

Ylva Gustafsson. Title: *Mesenchymal stromal cell therapy in rat models of pulmonary hypertension*. Clinical Scientist Training Programme (CSTP) Karolinska Institutet. Stockholm, Sweden (*to be presented*)

Elena Kuevda. Title: *Decellularization and recellularization of rat lung*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical University. Krasnodar, Russia (*to be presented*)

Alexander Sotnichenko. Title: *Decellularization and recellularization of rat heart*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical University. Krasnodar, Russia. (*to be presented*)

Irina Gilevich. Title: *Translation effects of bioactive molecules on tracheal regeneration*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical University. Krasnodar, Russia. (*to be presented*)

Alina Popova. Title: *Pathophysiological aspects of chondrogenesis in the culture of multipotent mesenchymal stromal cells*. Russian Federation programme for higher professional education, Grant agreement № 11.G34.31.0065. Kuban State Medical

University. Krasnodar, Russia. *(to be presented)*

Linda Helen Freidrich. Title: Preservation of aortic root architecture and properties using a detergent-enzymatic perfusion protocol. Medizinische Hochschule Hannover, Germany. *(to be presented)*

Annika Stuer Tissue engineering of the intestine. Medizinische Hochschule Hannover, Germany, Expected in 2016.

Natalie Keune. Title: *Immunological responses of cell-to-matrix interactions of tracheal scaffolds*, Friedrich Schiller University Jena, Jena, Germany, Expected in 2016.

Supervisor of postdoctoral program:

Dr. Manoli Iglesias. Title: *Experimental and clinical extracorporeal mechanical ventilation in refractory acute distress respiratory syndrome*. Universidad de Barcelona, Barcelona, Spain (June 2013).

Dr. David Sanchez. Title: *Pre-clinical efficacy of a novel extracorporeal ventilation device*. Universidad de Barcelona, Barcelona, Spain (June 2013).

Dr. Alberto Rodriguez. Title: *Cellular and molecular endothelial dysfunction in chronic pulmonary embolism*. Universidad de Barcelona, Barcelona, Spain (to be presented).

Dr. Philipp Jungebluth. Title: *Regenerative approaches to end-stage diseases of the airways*. Medizinische Hochschule Hannover. Hannover, Germany. (Expected substainance: Nov 2013)

Dr. Mei Ling Lim. Title: *Stem cell therapy for diseases to the respiratory tract*. Karolinska Institutet. Stockholm, Sweden (to be presented)

Dr. Greg Lemon. Title: *Mathematical modeling of whole organs for regeneration*. Karolinska Institutet. Stockholm, Sweden *(to be presented)*

Dr. Fatemeh Ajalloueian. Title: *Tissue engineering of artificial scaffolds*. Karolinska Institutet. Stockholm, Sweden (to be presented)

Dr. Elena Gubareva. Title: *Decellularization and recellularization of rat diaphragm*. Kuban State Medical University. Krasnodar, Russia (to be presented)

Dr. Johannes Haag. Title: *Improved biomechanics of tracheal natural scaffolds using cross-linking proteins*. Karolinska Institutet. Stockholm, Sweden *(to be presented)*

7.2 Responsibility of management/area of responsibility

See Director positions below

7.3 Administrative assignments within the institution/healthcare sector

- 3/2005 - 12/2009 Director, Post-graduate Program of General Thoracic Surgery, Hospital Clínic, Universidad de Barcelona, Barcelona, Spain
- 4/2000 - 12/2004 PhD Supervisor, General Thoracic Surgery, Universidad de Barcelona, Barcelona, Spain
Thoracic Surgery, Hannover Medical School, Hannover, Germany
- Director, Post-graduate (Residents & Fellows) Program of General Thoracic Surgery, Hannover Medical School, Hannover, Germany
- 4/1999 - 12/2004 Head and Chairman,
Department of General Thoracic and Vascular Surgery,
Heidehaus Hospital, Hannover Medical School,
Hannover, Germany
- 1/2005 - 12/2009 Senior Consultant and Chairman,
Department of General Thoracic Surgery
Hospital Clínic, University of Barcelona, Barcelona,
Spain
- 1/2010 – 9/2012 Director, European Center for Thoracic Research (CERT), University Hospital Careggi, Florence, Italy
- Director, BIOAIRlab (Laboratory of Bioengineering & Molecular airways), University Hospital Careggi, Florence, Italy
- 12/2010 – present Director, Advanced Center for Translational Regenerative Medicine (ACTREM), Karolinska Institutet, Stockholm, Sweden
- Director, European Airway Institute, Karolinska Institutet, Stockholm, Sweden
- 10/2011 – present Director of International Research, Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russia

7.4 Completed quality assurance work

Not applicable

7.5 Establishment and cooperation

International Scientific-Research Clinical and Educational Center of Regenerative Medicine, Kuban State Medical University, Krasnodar, Russia.Federation. Since October 2011

This center has been created after approval in October 2011 by the Russian Ministry of Education and Science and aims to promote excellence of research in the fields of airway and general thoracic and regenerative surgeries and intrathoracic biotransplantation. Funded by the Megagrant of the Russian Ministry of Education and Science (agreement No. 11.G34.31.0065), it is composed of a Director that coordinates the scientific committee to raise and supervise research projects in the different fields of the above domains, educate young doctoral and post-doctoral candidates at national and international level, and provide guidelines for the most cutting-edges therapies in the clinical fields of the above clinical sciences.
<http://www.regmedgrant.com/index.php?id=4&lang=eng>

European Airway Institute (EAI), Division of ENT (CLINTEC), University Hospital Huddinge, Sweden. Since September 2011.

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Advanced Center for Translational Regenerative Medicine (ACTREM), Division of ENT (CLINTEC), Stockholm, Sweden Since September 2011.

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<http://ki.se/en/clintec/actrem>

7.6 Management and cooperation

Not applicable

8 CONGRESS ORGANISATION

Principles of mechanical ventilation and aponoic oxygenation. Hannover, Germany, March 15, 2001.

- Surgical Therapies of the Bronchial Carcinoma, therapy and diagnostic.

Hannover, Germany, March 15, 2003.

- Lung Cancer. Cancer information day: “*Der Mensch im Mittelpunkt*”. Oncological Circle Hannover. Hannover (D). March 22, 2003.
Diagnosis and treatment of mediastinal tumors. Hannover, Germany, March 16, 2004.
- Current status of extracorporeal lung assistive devices. University of Barcelona, Barcelona, Spain. April 4, 2006
- Surgical approach to pulmonary hypertension. University of Barcelona, Barcelona, Spain. June 7, 2007
- Regenerative approaches to diseases of the respiratory system. University of Barcelona, Barcelona, Spain. January 12, 2009

9 COLLABORATION WITH THE SURROUNDING COMMUNITY

9.1 School

Not applicable

9.2 Government agencies

1. Ministry of education and science of the Russian Federation, State Budget Educational Institution of Higher Professional Learning “Kuban State Medical University” of the Ministry of Health Care and Social Development of the Russian Federation, 2011- present. “Regeneration of Airways and Lungs”
2. Italian Ministry of Education, 1987-1990: “Adjuvant chemotherapy for T1-T2N0M0 small cell lung cancer”
3. Italian Ministry of Education, 1988-1990: “Neoadjuvant chemotherapy, surgery and post-operative radiotherapy for invasive thymoma”
4. Italian Ministry of Education, 1988-1991: “Angiogenesis and metastasis in non-small cell lung cancer”
5. German Federal Ministry of Education and Research 2004-2006: “Re-endothelialisation of vascularised tissue engineered structures”
6. Tuscan Ministry of Health, 2010: “Airway tissue engineering”

9.3 Media

Highlights of media coverage in chronological order for the last 5 years.

- The Times. Claudia Castillo gets windpipe tailor-made from her own stem cells.
http://www.timesonline.co.uk/tol/life_and_style/health/article5183686.ece
19 Nov 2008
- BBC. Windpipe transplant breakthrough.
<http://news.bbc.co.uk/2/hi/7735696.stm> 19 Nov 2008
- The Guardian. Transplant first a giant leap for surgery.
<http://www.guardian.co.uk/society/2008/nov/19/stem-cell-transplant-claudio-castillo> 19 Nov 2008
- The Daily Star. First trachea transplant without drugs.
<http://www.thedailystar.net/newDesign/news-details.php?nid=64345> 22 Nov 2008
- The Times. New model humans. The transplant of a windpipe built from stem cells shows we are entering a new era of sci-fi medicine.

<http://www.timesonline.co.uk/tol/news/science/article5213509.ece> 23 Nov 2008

- Master Class of Paolo Macchiarini.
 - Master Class (Russia). Cellular technologies for tissue engineering and growing bodies.
<http://celltranspl.ru/novosti/anounce/kletochnye-tekhnologii-dlia-tkanevoi-inzhenerii-i-vyrashchivaniia-organov>. 7 Feb 2010
 - 9 additional Russian publications covering the master class given by Professor Macchiarini in 2010.
http://www.scienceagainstaging.com/News/news_17.html. 19 Feb 2010
- The Guardian. Boy's windpipe replaced in pioneering stem cell operation.
<http://www.guardian.co.uk/science/2010/mar/19/boy-windpipe-replaced-stem-cells> 19 Mar 2010
- The Times. 'Milestone moment' as boy undergoes transplant to regenerate trachea.
<http://www.timesonline.co.uk/tol/news/uk/health/article7068514.ece> 20 Mar 2010
- The Washington Times. Doctors: Transplant advance in windpipe [cancer](http://www.washingtontimes.com/news/2010/jul/30/doctors-transplant-advance-in-windpipe-cancer)
<http://www.washingtontimes.com/news/2010/jul/30/doctors-transplant-advance-in-windpipe-cancer> 30 Jul 2010
- ABC News. Stem Cell-Engineered Windpipe for Cancer Patients
<http://abcnews.go.com/Health/Health/successful-stem-cell-trachea-transplant/story?id=11308383> 2 Aug 2010
- The Washington Times. Sweden hospital in lab-made windpipe transplant.
- 20+ Russian media articles / interviews regarding tracheal transplant in Moscow, Russia (December 2010)
- First Tissue Engineered Tracheal Transplant- 7 Jul 2011
 - Russia-1 TV Channel. Vesti.
<http://www.vesti.ru/doc.html?id=502602>
 - BBC Russian Service.
http://www.bbc.co.uk/russian/rolling_news/2011/07/110706_rn_sweden_windpipe_first.shtml
 - ITAR-TASS National Russian New Agency. <http://itar-tass.com/>
 - "Polit.Ru" National Russian News Agency.
<http://polit.ru/news/2011/07/08/tracheas/>
 - "MIR 24" TV Channel. (Russia)
<http://mir24.tv/news/Science/4079889>
 - "EXPERT" National Weekly Journal. (Russia)
<http://expert.ru/2011/07/8/regeneratsiya-v-probirke/>

- The Washington Times. Doctors use lab-made windpipe in transplant.
<http://www.washingtontimes.com/news/2011/jul/7/doctors-use-lab-made-windpipe-in-transplant/>
- BBC. Surgeons carry out first synthetic windpipe transplant.
<http://www.bbc.co.uk/news/health-14047670>
- CBC News. Windpipe transplanted from man's own stem cells. <http://www.cbc.ca/news/story/2011/07/07/windpipe-transplant-stem-cell.html>
- CNN. Lab-Made Organ Implanted For First Time
<http://www.thedenverchannel.com/health/28476214/detail.html>
- USA Today. Lab-grown windpipe saves cancer patient
http://www.usatoday.com/NEWS/usaedition/2011-07-08-windpipe_ST_U.htm 7 Jul 2011
- ABC News. Sweden Hospital in Lab-Made Windpipe Transplant.
<http://abcnews.go.com/Health/wireStory?id=14020120>
- BBC News. First synthetic organ transplant.
<http://www.bbc.co.uk/news/health-14068012>
- NPR.org. Cancer Patient Gets First Totally Artificial Windpipe.
<http://www.npr.org/blogs/health/2011/07/20/137701848/cancer-patient-gets-first-totally-artificial-windpipe> 8 Jul 2011
- The Wall Street Journal. Lab-Made Trachea Saves Man
<http://online.wsj.com/article/SB10001424052702304793504576432093996469056.html?KEYWORDS=macchiarini> 8 Jul 2011
- Business & Health Cancer patient saved by first-ever synthetic organ transplant.
<http://www.ibtimes.com/articles/176700/20110708/transplant-windpipe-karolinska-sweden-surgeons-cancer-stockholm-organ-trachea.htm> 8 Jul 2011
- BdNews. First synthetic organ transplant in Sweden.
<http://bdnews24.com/details.php?id=200341&cid=2> 8 Jul 2011
- The Times Tribune. Lab-made windpipe used in transplant.
<http://thetimes-tribune.com/news/health-science/lab-made-windpipe-used-in-transplant.1.1172904?localLinksEnabled=false#axzz1VkrKpoCs> 9 Jul 2011
- The Hindu. Hospital in Sweden performs lab-made windpipe transplant
<http://www.thehindu.com/news/international/article2211776.0ce> 9 Jul 2011
- The Telegraph. First transplant of a fully synthetic organ carried out.
<http://www.telegraph.co.uk/health/healthnews/8624053/First-transplant-of-a-fully-synthetic-organ-carried-out.html> 22 Aug 2011
- The Telegraph. British doctors help perform world's first

transplant of a whole organ grown in lab.

<http://www.telegraph.co.uk/health/healthnews/3479613/British-doctors-help-perform-worlds-first-transplant-of-a-whole-organ-grown-in-lab.html> 22 Aug 2011

- Russian Ministry Megagrant announcements – Sept 2011
 - ITAR-TASS Russian National News Agency. <http://itar-tass.com/nauka/511254>
 - “Gazeta.Ru” – Russian inform agency. http://www.gazeta.ru/science/2011/09/21_a_3776609.shtml
 - Rossiyskaya Gazeta – Russian National Governmental Daily. <http://www.rg.ru/2011/09/21/granty-site.html>
 - Russian Reporter – Russian National Weekly Journal. <http://rusrep.ru/article/2011/09/28/mediki>
 - “Infox.Ru” Russian news agency. Russian regenerative medicine will be developed in Krasnodar”. http://www.infox.ru/science/human/2011/10/12/Paolo_Makkia_rini_bud.phtml
 - Rossiyskaya Gazeta. Center for lung regeneration will be developed in Krasnodar. <http://www.rg.ru/2011/12/01/medicina.html>http://www.infox.ru/science/enlightenment/2011/11/23/Nauka_za_prodyeniye.phtml
- Russian News coverage for Tissue Engineered Tracheal transplant in Krasnodar- Jun 2012
 - NPR. Synthetic Windpipe Transplant Boost For Tissue Engineering. <http://www.npr.org/2012/01/20/145525008/synthetic-windpipe-transplant-boost-for-tissue-engineering> 20 Jan 2012.
 - The Lancet. Paolo Macchiarini: Crossing Frontiers. The Lancet, Volume 379, Issue 9819, Page 886, 10 March 2012 doi:10.1016/S0140-6736(12)60382-1. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(12\)60382-1/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)60382-1/fulltext)
 - BBC News: Timeline Sweden: A chronology of key events. http://news.bbc.co.uk/2/hi/europe/country_profiles/1021943.stm
 - Russian TV Channel 1 – full coverage of the first transplantation, patient’ story. <http://www.1tv.ru/news/health/209612>
<http://www.1tv.ru/news/health/210034>
 - TV RUSSIA – Vesti – full coverage of the second transplantation, patient’ story. http://www.vesti.ru/only_video.html?vid=428296
 - Kuban TV. <http://kubantv.ru/kuban/krasnodarskie-khirurgi->

- [sotvorili-ocherednoe-chudo/](#)
 - The 9th TV Channel. <http://9tv.ru/news/item/29093>
 - INTERFAX New Agency. <http://www.interfaxrussia.ru/South/news.asp?id=322730&sec=1671>
 - RIA-Novosty, Russian National News Agency. <http://ria.ru/science/20120622/679624535.html>
 - GAZETA.RU. Megagrant Transplantation. http://www.gazeta.ru/science/2012/06/22_a_4637213.shtml
 - Komsomolskaya Pravda, National Daily. <http://www.kp.ru/daily/25911.3/2865802/http://meddaily.ru/article/28Jun2012/2voice>
- Russia- The opening of the International Scientific, Clinical and Educative Center of Regenerative Medicine. Nov 2012.
- K22 films. Supercells (Documentary about tissue engineered organ transplantation by James Cameron, producer of Avatar). <http://www.k22film.de/en/productions/>. Oct 2012.
 - New York Times. A First. Organs Tailor-made with body's own cells. http://www.nytimes.com/2012/09/16/health/research/scientists-make-progress-in-tailor-made-organs.html?pagewanted=all&_r=0 15 Sep 2012
 - Russia Channel 1. <http://www.1tv.ru/news/health/219711>
 - Kuban TV, Russia. <http://kubantv.ru/kuban/19589-v-krasnodare-otkrylsja-mezhdunarodnyjj-tsentr-regenerativnojj-medsiny/>
 - First Tissue Engineered Tracheal Transplant of a Child in the US
 - New York Times. Groundbreaking Surgery for Girl Born without Windpipe. <http://www.nytimes.com/2013/04/30/science/groundbreaking-surgery-for-girl-born-without-windpipe.html?pagewanted=all> 30 Apr 2013
 - The Wall Street Journal. Scientists Implant Lab-Made Trachea Into Toddler. <http://online.wsj.com/news/articles/SB10001424127887323982704578454872065830956> 30 Apr 2013
 - ABC. Toddler Born Without a Windpipe Gets Artificial Trachea. <http://abcnews.go.com/Health/toddler-born-windpipe-artificial-trachea/story?id=19073070>. 30 Apr 2013.
 - NBC. Girl, 2, is first child to receive artificial windpipe. <http://www.today.com/health/girl-2-first-child-receive-artificial-windpipe-6C9682725> 30 Apr 2013.

- CNN. Toddler gets new windpipe from her own stem cells. <http://www.cnn.com/2013/05/01/health/toddler-stem-cells-windpipe> 1 May 2013
 - RIA-Novosti – Russian National News Agency. <http://ria.ru/moscow/20130430/935345828.html>
 - Cell Transplantation and Tissue Engineering. <http://celltranspl.ru/novosti/transplantatsiia-tkaneinzhenernoi-trakhei-dvukhletnemu-rebenku>
 - Argumenty I Facti, National Weekly (Russia). <http://www.aif.ru/health/children/303316>
 - Gazeta.Ru –Russian National News Agency. http://www.gazeta.ru/health/2013/04/29_a_5283465.shtml
 - The Telegraph. Toddler given life-saving windpipe transplant using her stem cells. <http://www.telegraph.co.uk/science/science-news/10032750/Toddler-given-life-saving-windpipe-transplant-using-her-stem-cells.html> 2 May 2013.
 - ABC. Groundbreaking Trachea Transplant Could Become Routine. <http://abcnews.go.com/Health/groundbreaking-trachea-transplant-routine/story?id=20650841>. 23 Oct 2013.
- 20 most innovative surgeons alive today. <http://www.healthcare-administration-degree.net/20-most-innovative-surgeons-alive-today/>. 1 Dec 2013
 - NASDAQ. Harvard Apparatus Regenerative Technology Collaborator Successfully Transplants Regenerated Esophagus into Rat. <http://m.nasdaq.com/press-release/harvard-apparatus-regenerative-technology-collaborator-successfully-transplants-regenerated-esophagus-into-rat-20140415-00853>. Apr 2014
 - WDR. Artificial Organs - Rescue from the test tube. http://www.planet-wissen.de/sendungen/2014/04/04_sendung_organe.jsp. 14 Apr 2014.
 - Tracheal Transplant, Krasnodar, Russia, 3 Jun 2014
 - TV VGTRK. (Russia). Kuban doctors transplanted artificial trachea resident Crimea. <http://kubantv.ru/rossija/70029-kubanski-vrachi-peresadili-iskusstvennuju-trakheju-zhitelju-kryma/>
 - RIA-Novosti – National Russia News Agency. Unique trachea transplant operation performed in the Kuban. <http://ria.ru/society/20140604/1010621872.html>
 - Interfax News Agency (Russia). Crimean residents in Krasnodar successfully transplanted trachea grown from stem cells. <http://www.interfax-russia.ru/South/news.asp?id=506547&sec=1671>

- Arte (Germany.). TV Documentary- LIFESAVER STEM CELLS The Miracle of Krasnodar. <http://www.arte.tv/guide/de/047093-000/lebensretter-stammzellen>. 16 May 2014
- NBC. Meredith Vieira Special: A Leap of Faith. <http://www.nbcnews.com/feature/a-leap-of-faith>. 27 Jun 2014.

9.4 The larger community

- Patient associations or similar
 - Red Cross
 - Emergency
 - www.stemcellpioneers.com
 - Change a Life – Regenerate a Life
- Authorities:
 - EU evaluator FP7 Projects (EU, Brussels)
 - Vatican Scientific Foundation (Vatican)
 - ASPEN Institute Italia (Milan, Italy)
 - EMEA (European Medical Agency, London, UK)
 - Ethiopia (Heart for Ethiopia Humanitary Porgramme)
 - Russian Health Ministry
 - DFG (Deutsche Forschungsgemeinschaft, Germany). Domain: Organ and Tissue Transplantation (2002-2006)
 - Wellcome Trust (UK). Domain: Regenerative Medicine (2008-present)
 - Italian Association for Research in Cancer (Italy). Domain: Experimental cancer research (2007-2008)
 - EU evaluator FP7 (EU, Brussels). Domain: Regenerative medicine and organ transplantation (2010-2013)
 - EMEA (European Medical Agency). Domain: Stem cell and tissue engineering for end-stage lung diseases (since 2009)
 - ASPEN Institute Italia, Milan, Italy (since 2009)
 - European postgraduate school of Cardiothoracic surgery
 - Clinical Advisory Board, Technology and Innovation Center (<http://www.innovateuk.org/content/news/new-cell-therapy-technology-and-innovation-centre.ashx>)
 - Clinical Advisory Board, Technology Strategy Board (UK funding agency for industry) - <http://www.innovateuk.org/>

9.5 Communications

- Member of the Interdisciplinary pediatric thoracic center (MHH, Hannover, Germany)
- As member of PTFZ (pediatric research center (Hannover, Germany), monthly information meetings for patients, parents and physicians to develop clinical trials, experimental projects, monitoring and evaluation of data and parameters, provide education and courses for both physicians and health care staff, providing web-based information and discussion forum, inclusive tele-medical approaches (2000-2004).

- Development of information for patients' association (red cross, etc.), parents and physicians developing clinical trials and experimental projects;
- During my offices of Chairman of Departments, the annual health-programme (financial budget, type of care, *etc.*) was yearly discussed and programmed and monthly monitorid with the Hospital administrative authorities first and then with the national Insurance companies (Germany) and National Health System (Spain).

9.6 Private sector

- Effects of thymostimulin on chemotherapy-induced toxicity and long- term survival in small cell lung cancer (Serono Spa, 1985-1990: 35,000 €).
- Phase II studies of high-dose epirubicin in patients with small cell lung cancer. (Farmitalia Spa, 1985-1990: 70,000 €).
- Experimental and clinical evaluation of a new synthetic, absorbable sealant to reduce air leaks in thoracic surgery. (Focal Inc., USA, 1995-1997: 80,000 \$).
- Hyperthermic (41°C) isolated lung perfusion with high-dose of cisplatin for the treatment of surgically relapsing or unresectable lung sarcoma metastasis. (Bristol-Meyers grant, D, 2001-2004: 45,000 €).
- Perioperative Infection prophylaxis in elective lung surgery: prospective study with Rocephin versus retrospective control-analysis with aminopenicillin-Betalactamase-inhibitor-combination. (Roche Holding, 2002-2005: 5,000 €).
- Feasibility Study of a novel vascular access mode for artificial lung. (Novalung GmbH, 2005: 45,000 €).
- Caracterización celular y extracelular de la disfunción endotelial en la hipertensión pulmonar crónica post-embólica. (MAPFRE research grant, 2006: 13,200 €).
- Feasibility study of a novel treatment for post-pneumonectomy ARDS. (Novalung GmbH, 2006: 45,000 €).
 - Harvard Bioscience (www.harvardbioscience.com, USA)
 - Novalung GmbH (www.novalung.com, Germany)

10 INNOVATION EXPERIENCE

10.1 Patents

- Synthetic scaffolds and airway transplantations (US serial number 61/505,096)
- Bioreactor for tissue-engineering organ creation, registration number 2013138268, device 15/08/13, accepted
- Method of bioengineered rat lung scaffold creation, registration number

2013157732, Text/method, 26/12/13 – in process

- The method of bioengineered heart scaffold modeling in an experiment in rat, registration number 2014122633, Text/method, 26/05/14 – in process

10.2 Other intellectual property rights

Not applicable

10.3 Product development

Not applicable

10.4 Innovation work in the private sector

Not applicable

10.5 Other innovation experience

Not applicable

11 ENTREPRENEURSHIP

11.1 Enterprise start-up

Thoraxeuropea: A start-up company based in Barcelona (Spain) and providing healthcare excellence for all worldwide patients in need for treatment of chest diseases

Recreate e.V.: A start-up company based in Hannover (Germany) providing support for young clinical scientists and basic researchers.

11.2 Board assignments

Not applicable

11.3 Other entrepreneurial competence

International Scientific-Research Clinical and Educational Center of Regenerative Medicine, Kuban State Medical Univeristy, Krasnodar, Russian.Federation. Since October 2011

This center has been created after approval in October 2011 by the Russian Ministry of Education and Science and aims to promote excellence of research in the fields of airway and general thoracic and regenerative surgeries and intrathoracic biotransplantation. Funded by the Megagrant of the Russian Ministry of Education and Science (agreement No.

11.G34.31.0065), it is composed of a Director that coordinates the scientific committee to raise and supervise research projects in the different fields of the above domains, educate young doctoral and post-doctoral candidates at national and international level, and provide guidelines for the most cutting-edges therapies in the clinical fields of the above clinical sciences.

<http://www.regmedgrant.com>

European Airway Institute (EAI), Division of ENT (CLINTEC), University Hospital Huddinge, Sweden. Since September 2011.

This Institute has been establish as an international Centre of Excellence dedicated to patient care, research, training and education in the field of

complex disorders of the larynx, trachea and bronchus. The intention is to promote better care through a close, collaborative network. In this way, a unique world-class referral centre for this neglected and difficult-to-treat group of patients will be formed, a new range of treatments will be pioneered and the next generation of dedicated healthcare professionals in this field will be trained. Dr. Macchiarini has been appointed as the Director of the EAI with the task of organizing and structuring the Institute.

Advanced Center for Translational Regenerative Medicine (ACTREM), Division of ENT (CLINTEC), Stockholm, Sweden Since September 2011.

ACTREM was launched at the Karolinska Institutet in 2011 as a resource dedicated to the understanding and development and subsequent clinical transfer of novel therapies to regenerate damaged tissues and organs using cell therapy and tissue engineering approaches. Emphasis is given on the training and education of young academics in the field of translational regenerative medicine. Through association with the Karolinska Institutet, ACTREM is well positioned at the center of a consortium of world-class scientists and clinicians with diverse areas of expertise and a worldwide network of expert collaborators. Dr. Macchiarini has been appointed recently Director of the ACTREM with the task of raising funds and bringing together an interdisciplinary consortium including bioengineering, mathematical modeling, cell engraftment strategies, scaffold development, cell therapy *ex vivo*, *in vitro*, and *in vivo* models, and pharmacological regenerative approaches, able to enhance existing methodologies and develop new techniques for regenerative medicine therapies.
<http://ki.se/en/clintec/actrem>

12 MENTORSHIP

All residents and fellows that I have been assigned from the Ministry of Education in Germany, Spain and Italy during my office as Chairman of the Departments of General Thoracic Surgery at the Medizinische Hochschule in Hannover, the University Hospital Clinic in Barcelona and the University Hospital Careggi in Florence have been mentored during their courses, from the beginning to the final oral exams, passing through the surgical knowledgements and skills acquisition of all procedures required by the law to become specialized in general thoracic surgery.

- Prof. T. Walles: Chief of the Department of Thoracic Surgery, University of Würzburg, Germany
- Prof. C. Hagl: Chief of the Department of Cardiac Surgery, University Hospital Großhadern, University of München, Germany
- Dr. M. Richter: Head of the Thoracic Surgery Division, Klinikum Braunschweig, Teaching Hospital of the Medical University of Hannover, Germany
- Dr. P. Zardo: Head of the Thoracic Surgery Division, University of Magdeburg, Germany

- Dr. Matthias M. Altmayer: Senior Consultant at the Department of Thoracic Surgery, Klinikum Region Hannover, Oststadt-Heidehaus, Hannover, Germany
- Dr. T. Go: Head of Tracheal Surgery at the Department of General Thoracic Surgery, Kagawa University, Japan
- Dr. M Jaus: Head of the Thoracic Surgery, Pertini Hospital, Rome, Italy
- Dr. A. Gonfiotti: Senior Consultant at the Division of Thoracic Surgery, Careggi University Hospital, Italy
- Dr. David Sanchez: Consultant at the Department of Thoracic Surgery, Hospital Clinic, University Hospital Barcelona, Spain
- Dr. Elisabeth Martínez Téllez: Senior Consultant at the Department of Thoracic Surgery, University Hospital de la Santa Creu i Sant Pau, Barcelona, Spain
- Dr. Manoli Sanchez-Iglesias: Senior Consultant at the Division of Thoracic Surgery, Hospital Parc Tauli de Sabadell, Spain

13 DISTINCTIONS IN LEADERSHIP, DEVELOPMENT AND COLLABORATION

Not applicable

14 OTHER MERITS IN LEADERSHIP, DEVELOPMENT AND COLLABORATION

Not applicable

15 REFERENCES

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