

## Curriculum vitae

### Prof. Carlos A. Guzmán, MD, PhD



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**Born:** February 27<sup>th</sup>, 1959; Rosario (Argentina)  
**Nationalities:** Italian/Argentinean  
**Languages:** Spanish, Italian, English, German  
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#### Education:

1964 - 1971 Primary School, La Salle School, Rosario - Argentina  
1971 - 1975 Secondary School Education, La Salle School, Rosario - Argentina  
1975 *Perito Mercantil (marks 9.42/10, top of the class), La Salle School, Rosario - Argentina*  
1976 - 1981 Studies of Medicine, School of Medicine, National University of Rosario, Rosario - Argentina  
1981 *Medico/Physician with Honours Diploma (marks 9.068/10, top of the class), School of Medicine, National University of Rosario, Rosario - Argentina*  
1982 - 1986 Specialization in Bacteriology, National University of Rosario – Argentina  
1986 *Board Certification in Medical Bacteriology, College of Physicians State of Santa Fe - Argentina*  
1987 - 1988 Studies of Medicine and Surgery, School of Medicine and Surgery, University of Genoa – Italy  
1988 *Doctor of Medicine and Surgery (MD; marks: 110/110), School of Medicine and Surgery, University of Genoa, Genoa – Italy*  
1989 Qualifying Medical Graduates Examination (marks: 100/100), School of Medicine and Surgery, University of Genoa, Genoa – Italy  
1990 - 1993 Research Doctorate in Microbiological Sciences, University of Genoa, Genoa – Italy  
1993 *Doctor of Research in Microbiological Sciences (PhD), Italian Ministry of Education, University and Research - Italy*  
1995 Fortbildungs gem. §15 Abs. 2 Satz 1 Nr. 3 Gentechnik-Sicherheitsverordnung (GENTSV)  
2000 Habilitation in Medical Microbiology (*venia legendi*), Hanover Medical School, Hanover - Germany

## Scientific Career:

- 1977 - 1981 Fellow (Clinical Microbiology) at the Institute of Microbiological and Clinical Investigation (IDIMYC), Rosario - Argentina
- 1982 Fellow (Virology) of the Council of Deans of National Universities, School of Biochemistry and Pharmacy, University of Buenos Aires, Buenos Aires – Argentina
- 1982 – 1986
- Instructor of Medical Microbiology, and Assistant in Medical Virology, Department of Microbiology and Immunology, School of Medicine, National University of Rosario, Rosario - Argentina
  - Staff member, Department of Medical Microbiology, Italian Hospital, Rosario - Argentina
  - Staff member, Department of Medical Microbiology, Sanatorio de Niños (Children Clinic), Rosario – Argentina
  - Staff member, Institute of Microbiological and Clinical Investigation (IDIMYC), Rosario - Argentina
- 1983 Military service as Medical Lieutenant (Head of the Sanitary Services of the *Agrupación de Comunicaciones y Operaciones Electrónicas 601*), City Bell - Argentina
- 1986 – 1988 Research Fellow Italian Foreign Office Ministry, Institute of Microbiology, University of Genoa, Genoa - Italy
- 1988 - 1989 Research Fellow from “Consorzio Italiano Farmaci Antinfettivi”, Institute of Microbiology, University of Genoa, Genoa – Italy
- 1989 - 1991 Research Fellow from the European Communities Commission, at the Division of Microbiology, GBF-National Research Centre for Biotechnology, Braunschweig - Germany
- 1991 - 1993 Research Scientist, Laboratory of Microbial Pathogenesis, Institute of Microbiology, Genoa – Italy
- 1993 - 1994 Head, *Bordetella* Research Laboratory, Division of Microbiology, GBF-National Research Centre for Biotechnology, Braunschweig - Germany
- 1994 - 2005 Head, Vaccine Research Group, Department of Microbial Pathogenesis and Vaccine Research, Division of Microbiology, GBF-German Research Centre for Biotechnology, Braunschweig - Germany
- 2000 Short-listed for the “Hotung Chair of Molecular Vaccinology”, St. George’s Hospital Medical School, Univ. London, UK
- 2000 - 2004 Assistant Professor (Privatdozent) Department of Medical Microbiology and Hospital Epidemiology, Medical School Hanover, Hanover - Germany
- Since 2003 German Coordinator and Member of the Board for the International Doctorate in “*Experimental Oncology*” between the University of Ferrara (Ferrara, Italy), the Karolinska Institute (Stockholm, Sweden) and the German Research Centre for Biotechnology (Braunschweig, Germany)
- 2003 - 2012 Speaker for Research Topic “*Prevention and Therapy*” within the Research Program “*Infection and Immunity*” of the Helmholtz Association
- Since 2005 APL-Professor of Medical Microbiology (Personal Chair), Hanover Medical School, Hanover – Germany
- 2005 - 2007 Head, Department of Vaccinology, HZI-Helmholtz Centre for Infection Research, Inhoffenstraße 7, Braunschweig – Germany
- 2007 - 2012 Chair for the product group “Vaccines” of the European Infrastructure for Translational Medicine (EATRIS)
- 2007 Selected as Director of the ITQB “Instituto de Tecnologia Quimica e Biologica” and Director of the “Laboratório Associado” between the ITQB,

	the IGC “Instituto Gulbenkian de Ciencia” and the IBET “Instituto de Biologia Experimental e Tecnológica” (declined)
2007 - 2008	Acting Head, Division of Microbiology, HZI-Helmholtz Centre for Infection Research, Inhoffenstraße 7, Braunschweig – Germany
Since 2007	Member of the Steering Committee (Lenkungsausschuss) of the HZI-Helmholtz Centre for Infection Research, Inhoffenstraße 7, Braunschweig – Germany
2008 - 2012	External Lecturer Doctorate in Biotechnology, University of Catania, Italy
Since 2008	Head, Department of Vaccinology and Applied Microbiology, HZI-Helmholtz Centre for Infection Research, Inhoffenstraße 7, Braunschweig – Germany
2009 - 2012	Chair for the area “Vaccines & Antiinfectives” from the Indo-German Science Centre for Infectious Diseases
Since 2012	HZI Research Coordinator for the Cross Program Activity “Metabolic Dysfunction and Human Disease” of the Helmholtz Association
Since 2013	Speaker for Research Topic “ <i>Immune response and interventions</i> ” within the Research Program “ <i>Infection Research</i> ” of the Helmholtz Association
Since 2013	National Science Coordinator, Helmholtz-Alberta Initiative - Infectious Disease Research (HAI-IDR; international cooperation between the Helmholtz Association and the University of Alberta in Edmonton - Canada)

#### **Awards/Fellowships:**

1977 - 1981	Trainings Fellowship in Medical Microbiology, the Institute of Microbiological and Clinical Investigation (IDIMYC), Rosario - Argentina
1981	Honour’s Diploma in Medicine (top of the class, marks 9.068/10; resolution n. 309 “Y” book 47)
1982	Fellowship from the Council of Deans of National Universities - Argentina
1986 - 1988	Fellowship Italian Foreign Ministry
1988 - 1989	Fellowship Consorzio Italiano Farmaci Antinfettivi - Italy
1989 - 1991	Fellowship from the European Communities Commission
2008	Prize “Rene Gastaldello” IX Argentinean Congress of Virology

#### **Reviewing and Consultant Activities:**

- French National Research Agency (ANR) Microbiology, Immunology and Infection Panel non thematic program (2010-2011)
- NIH/NIAID extramural activities (USA)
- Italian Ministry for University and Research
- Istituto Superiore di Sanità Rome (ISS) - Technical body of the Italian National Health Service (International Advisory Board Clinical Trials for HIV/AIDS vaccines)
- Istituto Superiore di Sanità Rome (ISS) - Advisory Board from the Italian Concerted Action for the Development of a Vaccine against HIV/AIDS (ICAV)
- Scientific Advisory Board, Italian National AIDS Research Program
- Scientific Advisory Board, Vaccine Project Management GmbH
- Cancer Research UK

- German Israeli Foundation (GIF)
- Austrian Ministry for Education Science and Culture
- Member of the External Reviewing Panel for the Tumor Immunology Program of the German Cancer Research Center (DKFZ) in 2006
- Canadian-German collaboration on Infectious Disease (2006) – Expert in Vaccinology for the “Vaccine Development and Evaluation” panel
- Terry Fox Cancer Fund, Faculty of Medicine & Health Sciences of the United Arab Emirates
- Argentinean Ministry of Education, Science and Technology
- Chilean National Fund for Scientific and Technological Development (FONDECYT)
- Natural Sciences and Engineering Research Council of Canada,
- WHO
- IAVI (International AIDS Vaccine Initiative)
- Institute Pasteur
- Philip Morris External Research Program
- German-Israeli Foundation for Scientific Research & Development
- University of Siena
- Alexander von Humboldt Foundation
- UBS Optimus Foundation
- Volkswagen Foundation
- DAAD (German Academic Exchange Service)
- Member of the Scientific Advisory Board of AMVAC
- Member of the Scientific Advisory Board of BIRD-C
- Member of the Scientific Advisory Board of the Vakzine Projekt Management GmbH
- Mukoviszidose e.V., Deutsche Gesellschaft zur Bekämpfung der Mukoviszidose
- Creatogen AG
- *Ad-hoc* reviewer for the Deutsche Forschungsgemeinschaft (DFG)
- Queensland Institute of Medical Research (personnel appointment/promotion)
- University of Maryland – School of Medicine (personnel appointment/promotion)

#### **Editorial Responsibilities:**

- Member Editorial Board of the *Journal of Bacteriology* (1994-1996)
- Member Editorial Board *Biotechnology et alia* (1997-1998)
- Member Editorial Board of *Infection and Immunity* (1998 – 2015)
- Member Editorial Board of *Current Immunology Reviews* (since 2004)
- Member Editorial Board of *Microbial Biotechnology* (since 2007)
- Member Editorial Board of *Open Immunology Journal* (since 2007)
- Member Editorial Board of *Open Microbiology Journal* (since 2007)
- Member Editorial Board of the *Open Vaccine Journal* (since 2008)
- Member Editorial Board of *Bioengineered Bugs* (since 2009)
- Member Editorial Board of *Vaccine* (2013-2015)
- Section Editor 2004 for “Pharmaceutical Biotechnology” for *Current Opinion in Biotechnology*
- Associated Editor *Human Vaccines & Immunotherapeutics* (since 2005)

- Review Editor *Frontiers in Mucosal Immunology* (since 2010)
- Member 'Council of 100' of *Vaccine* (since 2013)
- *Ad-hoc* reviewer: *Molecular Microbiology*, *Journal of Biotechnology*, *Cellular and Molecular Life Sciences*, *Environmental Microbiology*, *Journal of Immunology*, *Microbial Pathogenesis*, *Nature Biotechnology*, *FEMS Immunology and Medical Microbiology*, *FEMS Microbiology Letters*, *Trends in Biotechnology*, *Journal of Infectious Diseases*, *FASEB*, *Cancer Research*, *Gene Therapy*, *Biomed Central Immunology*, *Plasmid*, *Microbes and Infection*, *Trends in Biotechnology*, *Clinical Infectious Diseases*, *Immunology*, *Expert Review of Vaccines*, *Expert Opinion on Drug Delivery*, *Journal Molecular Cancer Therapeutics*, *Proceedings National Academy of Sciences USA*, *Current Medicinal Chemistry*.
- Editor of the book "Pharmaceutical Biotechnology", C. A. Guzmán & G. Feuerstein (eds.). Landes Bioscience, Austin, USA.

#### **Other activities:**

- Member of the HZI Animal Facilities users Commission (Chairman from 2003-2006)
- Member of the "Betriebsrat" of the GBF (2000-2004)
- Member of the GBF/HZI Library Commission (from 1996; Chairman from 2000-2004)
- Member of the Thesis Commission for Internal Medicine (Promotionsausschusses 2.1.5) of the Hannover Medical School (since 2005)

#### **Fields of Interest:**

My work is focused in the field of Vaccinology, with the specific goal of establishing tools & strategies to prevent and treat infectious diseases. This major aim is achieved by pursuing the following specific objectives: (i) understand the underlying mechanisms of host response to infection and vaccination, (ii) discover and develop new immune modulators to fine tune responses to immune interventions, including compounds acting by mucosal route and in subpopulation groups of poor responders, such as the elderly, (iii) generate delivery systems for antigen, DNA & therapeutic molecules, (iv) establish experimental models based on humanized mice for preclinical validation of vaccines and therapeutics, and (v) develop and test vaccine candidates against specific diseases. In addition to the core team focused on vaccine technologies, the department also has five independent research groups (their publications are not included in the list below). The Microbial Diagnostics Group (head, Dr Manfred Höfle) is focused on the development and application of molecular tools for the detection and quantification of human pathogens in clinical and environmental samples. Concentrating on food-, water- and airborne pathogens, the group contributes to a better understanding of the ecology and epidemiology of major infectious diseases. The Research Group Chemical Microbiology (head, Dr Wolf-Rainer Abraham) is focused on the study of biofilm communities, with the aim of understanding the relation between biodiversity in biofilms and metabolic activities in order to identify factors controlling their stability, with the ultimate goal of using this knowledge to develop new strategies to control biofilm formation. The Junior Research Group Phagosome Biology (head, Dr Maximiliano Gutierrez; active until the end of 2013) aim at elucidating the mechanisms by which macrophages kill mycobacteria, and dissecting the molecular mechanisms exploited by pathogenic mycobacteria to selectively block phagosome functions; this knowledge should guide towards the development of new strategies to combat mycobacteria. The Junior Research Group Immune Aging and Chronic Infections (head, Prof Dr Luka Cicin-Sain) is focused on the role of chronic infection in the processes of immune homeostasis and senescence. This knowledge should provide the basis to unravel immune evasion mechanisms operating

during infection, as well as to develop new strategies to combat chronic viral infections caused by agents such as herpesviruses. Finally, the new Junior Research Group Microbial Immune Regulation (head, Dr Till Strowig; started in June 2013) assesses the role of commensal flora in the outcome of infection and vaccination. The Department is composed by approximately 70 members, including scientists, PhD and Master students, technical assistants, 1 project manager and 2 secretaries.

## Publications

1. Hernandez-Vargas, E. A., Wilk E., Canini L., Toapanta F. R., Binder S., Uvarovskii A., Ross T. M., **Guzman C. A.**, Perelson A. S., and Meyer-Hermann M (2014). The effects of aging on influenza virus infection dynamics. *Journal of Virology*. In press.
2. Caccuri, F., Giagulli C., Reichelt J., Martorelli D., Marsico S., Bugatti A., Barone I., Marco M., Guzman C.A., Dolcetti R., and Caruso A. (2014). SIV and HIV-1 matrix proteins specify different capabilities to modulate B cell growth. *Journal of Virology*. In press.
3. Caccuri, F., Rueckert C., Giagulli C., Basta D., Schulze K., Zicari S., Marsico S., Cervi E., Fiorentini S., Slevin M., **Guzman C.A.**, and Caruso A. (2014). HIV-1 matrix protein p17 promotes lymphangiogenesis and activates the endothelin-1/endothelin B receptor axis. *Arteriosclerosis, Thrombosis, and Vascular Biology*. In press.
4. Gras, C., Antarianto R., Schulze K., Goudeva L., **Guzman C.A.**, Blasczyk R., and Figueiredo C. (2013). HLA-universal platelet transfusions prevent platelet refractoriness in a mouse model. *Human Gene Therapy*. 24:1018-1028.
5. Gismondi, M. I., Díaz Carrasco J. M., Valva P., Becker P. D., **Guzmán C. A.**, Campos R. H., and Preciado M. V. (2013). Dynamic changes in viral population structure and compartmentalization during chronic hepatitis C virus infection in children. *Virology*. 447:187-196.
6. Mittal, A., Raber A.S., Schaefer U.F., Weissmann S., Ebensen T., Schulze K., **Guzmán C.A.**, Hansen S., Lehr C-M. (2013). Transfollicular delivery of antigen using nanocarriers for non-invasive transcutaneous immunization. *Controlled Release Society (CRS) letters*. 30:16-17.
7. Gurrakonda, C., Nemani S. K., Zahid M., Ahmad A., Lünsdorf H., Gudi S. K., Ebensen T., **Guzman C. A.**, Khanna N., and Rinas U. (2013). Viral-like particles from recombinant yeast *Pichia pastoris*: detergent assisted solubilization, ion-exchange chromatography and characterization followed by mice analysis. *Journal of Chromatography*. 940:104-111.
8. Mittal, A., Raber A. S., Schaefer U. F., Ebensen T., Schulze K., **Guzmán C. A.**, Lehr C-M., Hansen S. (2013). Non-invasive delivery of nanoparticles to hair follicles: a perspective for transcutaneous immunization. *Vaccine*. 31:3442-3451.
9. Svindland, S. C., Pedersen G. K., Pathirana R. D., Bredholt G., Nøstbakken J. K., Jul-Larsen Å., **Guzman C. A.**, Montomoli E., Lapini J., Piccirella S., Jabbal-Gill I., Hinchcliffe M., Cox R. J. (2013) A study of Chitosan and c-di-GMP as mucosal adjuvants for intranasal influenza H5N1. *Influenza and Other Respiratory Viruses*. 7:1181-1193.
10. Caccuri, F., Giagulli C., Bugatti A., Benetti A., Alessandri G., Ribatti D., Marsico S., Apostoli P., Slevin M., Rusnati M., **Guzmán C. A.**, Fiorentini S., and Caruso A. (2012). HIV-1 matrix protein p17 is a pro-angiogenic chemokine acting via CXCR1/CXCR2-mediated activation of Akt-dependent ERK signalling. *Proceedings National Academy Sciences USA*. 109:14580-14585.
11. Ebermann, L., Ruzsics Z., **Guzman C. A.**, van Rooijen N., Casalegno-Garduño R., Koszinowski U., and Cicin-Sain L. (2012). Block of death-receptor apoptosis protects mouse cytomegalovirus from macrophages and is a determinant of virulence in immunodeficient hosts. *PLoS Pathogens*. 8(12):e1003062.
12. Krishnaswamy, J.K., Jirmo A. C., Constabel H., Baru A.M., Ebensen T., **Guzmán C.A.**,

- Sparwasser T., and Behrens G.M.N. (2012). TLR2 agonist-allergen coupling efficiently redirects Th2 cell responses and inhibits allergic airway eosinophilia. *American Journal of Respiratory Cell and Molecular Biology*. 47:852-63.
13. Waern, J. M., Yuan Q., Rüdrieh U., Becker P.D., Schulze K., Strick-Marchand H., Huntington N.D., Wursthorn K., Di Santo J.P., **Guzman C.A.**, Manns M.P., Ott M., and Bock M. (2012) Ectopic expression of murine CD47 minimizes macrophage rejection of human hepatocyte xenographs in immunodeficient mice. *Hepatology*. 56:1479-1488.
  14. Yevsa T., Schulze K., Fuchs B., Gross R., and **Guzmán C.A.** (2012) Development and characterization of attenuated metabolic mutants of *Bordetella bronchiseptica* for applications in vaccinology. *Environmental Microbiology*. 15:64-67.
  15. Nörder M., Gutierrez M.G., Zicari S., Cervi E., Caruso A., and **Guzmán C.A.** (2012). Lymph node-derived lymphatic endothelial cells express functional co-stimulatory molecules and impair dendritic cell-induced allogenic T cell proliferation. *FASEBJ*. 26:2835-2846.
  16. Zygmunt, B.M., Weissmann S.F., and **Guzman C.A.** (2012) NKT cell stimulation with  $\alpha$ -galactosyl ceramide results in a block of Th17 differentiation after intranasal immunization in mice. *PLoS ONE*. 7(1):e30382.
  17. Pedersen, G. K., Ebensen T., Gjeraker I. H., Svindland S., Bredholt G., **Guzmán C.A.\***, and Cox R. J.\* (2011). Evaluation of the sublingual route for administration of influenza H5N1 virosomes in combination with the bacterial second messenger c-di-GMP. \*Equal contributors. *PLoS ONE* 6(11): e26973. doi:10.1371/journal.pone.0026973
  18. Madhun, A.S., Haaheim L.R., Nøstbakken J.K., Ebensen T., Chichester J., Yusibov V., **Guzman C.A.**, and Cox R.J. (2011) Intranasal c-di-GMP-adjuvanted plant-derived H5 influenza vaccine induces multifunctional Th1 CD4+ cells and strong mucosal and systemic antibody responses in mice. *Vaccine*. 29:4973-4982.
  19. Ebensen, T., Libanova R., Schulze K., Yevsa T., Morr M., and **Guzman C.A.** (2011) Bis-(3',5')-cyclic dimeric adenosine monophosphate: strong Th1/Th2/Th17 promoting mucosal adjuvant. *Vaccine*. 29:5210-5220.
  20. Zygmunt, B.M., Groebe L., and **Guzman C.A.** (2011) Peritoneal cavity is dominated by IFN $\gamma$ -secreting CXCR3+ Th1 cells. *PLoS ONE*; 6(7):e18032. Epub 2011 Jul 18.
  21. Huntington, N.D., Alves N.L., Legrand N., Lim A., Strick-Marchand H., Mention J.J., Plet A., Weijer K., Jacques Y., Becker P.D., Guzman C., Soussan P., Kremsdorf D., Spits H., and Di Santo J.P. (2011) IL-15 trans-presentation promotes both human T-cell reconstitution and T-cell-dependent antibody responses in vivo. *Proceedings National Academy of Sciences USA*. 108:6217-6222.
  22. Knothe, S., Mutschler V, Rochlitzer S, Winkler C, Ebensen T, **Guzman C.A.**, Braun A., Müller M. (2011) The NKT cell ligand  $\alpha$ galactosylceramide suppresses allergic airway inflammation by induction of a Th1 response. *Vaccine*. 29:4249-4255.
  23. TrehanPati, N., Sukriti, Geffers R., Hissar S., Riese P., Toepfer T., Buer J., Adams D.H. **Guzman C.A.**, and Sarin S.K. (2011) Acute and resolving phase of HEV infected patients and its cellular immune and global gene expression patterns. *Journal of Clinical Immunology*. 31:498-508.
  24. Knothe, S., Mutschler V., Rochlitzer S., Winkler C., Ebensen T., **Guzman C.A.**, Hohlfield J., Braun A., Muller M. (2011). Local treatment with BPPcysMPEG reduces allergic airway inflammation in sensitized mice. *Immunobiology* 216:110-7. PMID: 20619481.
  25. Becker, P.D., Legrand N., van Geelen C. M., Noerder M., Huntington N.D., Lim A., Yasuda E., Diehl S.A., Scheeren F.A., Ott M., Weijer K., Wedemeyer H., Di Santo J.P., Beaumont T., **Guzman C.A.**, and Spits H. (2010) Generation of human antigen-specific monoclonal IgM antibodies using vaccinated "human immune system" mice. *PLoS ONE*. Oct 4;5(10).pii:e13137.
  26. Björkström, N. K., Riese P., Heuts F., Andersson S., Fauriat C., Ivarsson M.A., Björklund A. T., Flodström-Tullberg M., Michaëlsson J., Rottenberg M.E., **Guzmán C.A.**, Ljunggren H-G, and Malmberg K-J. (2010). Expression Patterns of NKG2A, KIR and CD57 Define a Process of

- CD56dim NK cell Differentiation Uncoupled from NK Cell Education. *Blood*. **116**:3853-3864.
27. Prajeeth, C.K., Jirno A.C., Krishnaswamy J.K., Ebensen T., **Guzman C.A.**, Weiss S., Constabel H., Schmidt R.E., and Behrens G.M.N. (2010) The synthetic TLR2 agonist BPPcysMPEG leads to efficient cross-priming against co-administered and linked antigens. *European Journal of Immunology*. **40**:1272-1283.
  28. Noerder, M., Becker P.D., Drexler I., Link C., Erfle V., and **Guzmán C.A.** (2010) Modified vaccinia virus Ankara exerts potent immune modulatory activities in a murine model. *PLoS ONE Jun 30*;5(6):e11400.
  29. Fritzer, A., Senn B.M., Minh D.B., Hanner M., Gelbmann D., Noiges B., Henics T., Schulze K., **Guzman C.A.**, Goodacre J., von Gabain A., Nagy E., Meinke A.L. (2010). Novel conserved group A streptococcal proteins identified by the ANTIGENome technology as vaccine candidates for a non-M protein based vaccine. *Infect. Immun.* **78**:4051-4067. PMID: 20624906.
  30. Switalla, S., Lauenstein L., Prenzler F., Knothe S., Förster C., Fieguth H-G., Pfennig O., Schaumann F., Martin C., **Guzman C.A.**, Ebensen T., Müller M., Hohlfeld J.M., Krug N., Braun A., and Sewald K. (2010). Natural innate cytokine response to immunomodulators and adjuvants in human precision-cut lung slices. *Toxicology and Applied Pharmacology* April 29. [Epub ahead of print] PMID: 20434477.
  31. Cazorla, S.I., Frank F.M., Becker P.D., Arnaiz M., Mirkin G.A., Corral R.S., **Guzmán C.A.\***, and Malchiodi M.L.\* (2010). Redirection of the immune response to the functional catalytic domain of cruzipain improves protective immunity against *Trypanosoma cruzi*. *Journal of Infectious Diseases*. \* Corresponding authors. **202**:136-144.
  32. Stegmann, K.A., Björkström N. K., Liermann H., Ciesek S., Riese P., Wiegand J., Hadem J., Suneetha P.V., Jaroszewicz J., Wang C., Schlaphoff V., Fytli P., Cornberg M., Manns M.P., Geffers R., Pietschmann T., **Guzmán C.A.**, Ljunggren H-G., Wedemeyer H. (2010). IFN alpha-induced TRAIL on human NK cells is associated with control of hepatitis C virus infection. *Gastroenterology*. **138**:1885-1897.
  33. Libanova, R., Ebensen T., Schulze K., Bruhn D., Nörder M., Yevsa T., Morr M., and **Guzman C.A.** (2010). The member of the cyclic di-nucleotide family bis-(3',5')-cyclic dimeric inosine monophosphate exerts potent activity as mucosal adjuvant. *Vaccine*. **28**:2249-2258.
  34. Fuchs, B., Knothe S., Rochlitzer S., Nassimi M., Greweling M., Lauenstein H-D., Nassenstein C., Müller M., Ebensen T., Dittrich A-M., Krug N., **Guzman C.A.**, and Braun A. (2009). A Toll-like receptor 2/6-agonist reduces allergic airway inflammation in chronic respiratory sensitisation to Timothy grass pollen antigens. *International Archives of Allergy and Immunology*. **152**:131-139.
  35. Zygmunt, B. M., Rharbaoui F., Groebe L., and **Guzman C. A.** (2009). Intranasal immunization promotes Th17 immune responses. *Journal of Immunology*. **183**:6933-6938.
  36. Haridass D., Yuan Q., Becker P. D., Cantz T., Iken M., Rothe M., Narain N., Bock, M., Nörder M., Legrand N., Wedemeyer H., Weijer K., Spitz H., Manns M. P., Cai J., Deng H.-K., Di Santo J., **Guzman, C. A.** and Ott M. (2009). Repopulation efficiencies of adult hepatocytes, fetal liver progenitor cells and embryonic stem cell-derived hepatic cells in Alb-uPA mice. *American Journal of Pathology*. **175**:1483-1492. Aug 28. [Epub ahead of print].
  37. Giagulli, C., Noerder M., Avolio M., Becker P.D., Fiorentini S., **Guzman C.A.**, Caruso A. (2009). Pidotimod promotes functional maturation of dendritic cells and displays adjuvant properties at the nasal mucosa level. *Int. Immunopharmacol.* **9**:1366-1373.
  38. Palma, C., Iona E., Ebensen T., **Guzman C. A.**, and Cassone A. (2009). The Toll-like receptor 2/6 ligand MALP-2 reduces the viability of *Mycobacterium tuberculosis* in murine macrophages. *Open Microbiology Journal*. **3**:47-52.
  39. Harth-Chu, E., Espejo R. T., Christen R., **Guzmán C. A.**, and Höfle M.G. (2009). Multiple-locus variable-number of tandem-repeats analysis for clonal identification of *Vibrio parahaemolyticus* isolates y using capillary electrophoresis. *Applied and Environmental Microbiology*. **75**:4079-



- 4088 (2009 Apr 17. [Epub ahead of print]).
40. Pati, N. T., Geffers R., Sukriti, Hissar S., Riese P., Toepfer T., Buer J., **Guzman C. A.\***, and Sarin S. K.\* (2009) Gene expression signatures of peripheral CD4+ T cells clearly discriminate between patients with acute and chronic hepatitis B viral infection. *Hepatology*. In press. (\*) Joint senior authors. **49**:781-790 (2008 Nov 13. [Epub ahead of print])
  41. Bosch. V., Pfeiffer T., Devitt G., Allespach I., Ebensen T., Emerson V., **Guzman C. A.**, and Keppler O.T. (2009) HIV pseudovirion vaccine exposing Env “fusion intermediates” – response to immunisation in human CD4/CCR5-transgenic rats. *Vaccine*. **27**:2202-2212.
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### **Submitted manuscripts:**

Martinez-Arias, R., Goesmann A., **Guzman C.A.**, and Gross R. Complete genome sequence of *Bordetella petrii* type strain (Se-1111R). Submitted to Standards in Genomic Sciences (SIGS).

Pandey, S. P., Chandel H. S., Selvaraj S. K., Shukla D., Ebensen T., **Guzman C. A.**, and Saha B. BPPcysMPEG, a TLR2/6 ligand, elicits host-protective anti-leishmanial immune response. Submitted JI.

Matos, M. N., Cazorla S. I., Bivona A. E., Morales C., Guzmán C. A., and Malchiodi E. L. Tc52 amino terminal domain DNA carried by attenuated *Salmonella* induce protection against a *Trypanosoma cruzi* lethal challenge. Submitted to Human Gene Therapy.

Stern C., Trittel S., Riese P., **Guzman C.A.**, Leschner S., and Weiss S. Anti-tumor T cell induction by bacteria-mediated cancer therapy. Submitted to Journal of Clinical Investigation.

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Neuhaus, V., Chichester J.A., Ebensen T., Schwarz K., Hartman C.E., Shoji Y., **Guzmán C.A.**, Yusibov V., Sewald K., Braun A. A new adjuvanted nanoparticle-based H1N1 influenza vaccine induced antigen-specific local mucosal and systemic immune responses after administration into the lung. Submitted to Vaccine.

Kramer, R., Sauer-Heilborn A., Welte T., **Guzman C.A.**, Höfle M.G., and Abraham W-R. Use of volatile organic compounds for diagnostics of respiratory infections in vitro and in exhaled breath of CF patients. Submitted to European Journal of Clinical Microbiology & Infectious Diseases.

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Dutruel, C., Thole J., Geels M., Mollenkopf H-J., Ottenhoff T., **Guzman C. A.**, Fletcher H. A., Leroy O., and Kaufmann S.H.E. TRANSVAC workshop on standardisation and harmonisation of analytical platforms for HIV, TB and malaria vaccines: 'How can big data help?' Submitted to Vaccine (Brief Report).

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Riese, P., Schulze K., and **Guzmán C. A.** Evaluation of rodents as models for assessing vaccine performance in humans. Review under preparation

Mittal, A., Schulze K., Ebensen T., Weissmann S., Hansen S., Guzman C. A.\*, Lehr C. M.\* Inverse micellar sugar glass nanoparticles as delivery system: adjuvant co-encapsulation and the route of administration have a major impact on immunization outcome. \*Join senior authors. Under preparation.

Retamal-Díaz, A., Riquelme-Neira R., Sáez D., Rivera A., Fernández P., Cabrera A., **Guzmán C. A.**, and Oñate A. S-[2,3-bisphalmitoyloxy-(2R)-propyl]-R-cysteinyI-amido-monomethoxy polyethylene glycol use as adjuvant improved protective immunity to a DNA vaccine encoding Cu, Zn superoxide dismutase of *Brucella abortus* in mice. Under preparation.

## Review Articles

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### **Book chapters**

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### **Other Publications**

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### **Patents:**

- 1991** Plasmids for the expression of filamentous hemagglutinin (FHA) and host therefore (plasmide zur FHA-Expression und Wirte). International Patent PCT/EP 92/00 814 "FHA-vektoren" (09/04/1991) on basis of the German patent n. P 41 11 531.7, inventors **C. A. Guzman**, M. J. Walker and K. N. Timmis.
- 1991** Metodo rapido per l'identificazione dello *S. aureus*, kit diagnostico per l'esecuzione di tale metodo, anticorpi monoclonali contro la glucosaminidasi dello *S. aureus* e ibridoma per la produzione di tali anticorpi (rapid method for the *S. aureus* identification, diagnostic kit for that purpose, monoclonal antibodies against *S. aureus* glucosaminidase and hybridoma to produce these antibodies). Italian Patent application n. TO 91 A 001003, inventors **C. A. Guzman**, C. Pruzzo and G. Satta).
- 1991** Impfstoff gegen Schleimhautreger und Herstellungsverfahren (vaccine against pathogens of mucosae and process for preparation). German patent application n. P 41 36 553.4 (06.11.1991), inventors Brahmhatt, R. Brownlie, J. Wehland, K. Timmis, D. C. White, M. W. Fountain, **C. A. Guzman** and M. J. Walker. International patent application (International application No. PCT/US92/09591).
- 1997** European and International Patent Application 97 106 503.2 "*Salmonella typhimurium* strain" inventors Darji, A., **Guzmán C. A.**, Gerstel B., Wachholz P., Timmis K. N., Wehland J., Chakraborty T., and Weiss S.
- 1997** European and International Patent Application 97 108 403.3 "Sfbl protein from *Streptococcus pyogenes*: novel mucosal adjuvant". Inventors Medina, E., Chhatwal G. S., and **Guzmán C. A.**
- 1999** European and International PCT/EP99/06514 "Attenuated Salmonella SPI2 mutants as antigen carries". Inventors Hensel M., **Guzmán C. A.**, Medina E., Apfel H., Hueck C., Holden D.W. and Shea J. E. (EP/04.09.98/EPA 98116827; filing 03.09.99 *The rights for this patent have been sold to Microsciences (proprietor Emergent Product Development UK limited)*).
- 2000** European Patent Application "R5 protein, a new cell-surface protective antigen of group B streptococci. Inventors Chhatwal G. S., Talay S. R., and **Guzmán C. A.**
- 2001** Basso H. and **Guzmán C. A.** Novel Intracellular activated gene from *Salmonella enterica* serovar Typhi required for virulence. US-Provision filling 16.8.2001
- 2002** Mühlradt P. F. and **Guzmán C. A.** Verwendung eines Lipopeptids oder Lipoproteins als Adjuvans bei therapeutischer oder prophylaktischer Vakzinierung (Use of a lipopeptide or lipoprotein as adjuvant for a therapeutic or prophylactic vaccination). Priority 04.04.2002 filed 03.04.03 (08009600.1 – 2404; PCT/DE03/03497; EP/04.04.02/EPA 02007640). *Licensed*.
- 2005** Ebensen T., Morr M. and **Guzmán C. A.** Use of hexosylceramides as adjuvants and their uses in pharmaceutical compositions EPA05022771.9 (priority 19.10.2005) [PCT/EP2006010086].
- 2005** Ebensen T., Morr M. and **Guzmán C. A.** Cyclic-dinucleotides and its conjugates as adjuvants and their uses in pharmaceutical compositions EP/08.11.05 EPA05024266 (PCT/EP2006010693).

- 2005** Ebensen T., Morr M. and **Guzmán C. A.** PQS and its conjugates as adjuvants and their uses in pharmaceutical compositions 06828961.0-2107 PCT/EP2006/010699 EP/08.11.05/EPA05024266 (filed 08.11.2005).
- 2005** Ebensen T., Morr M. and **Guzmán C. A.** New adjuvants on the basis of bisacyloxypropylcystein conjugates and their uses in pharmaceutical compositions 05025431.7 (priority EP/22.11.2005; EPA 05025431; PCT/EP2006011182; 06818729.3-2404). *Licensed.* (Ersterteilung in Südafrika, 2010)
- 2006** Ebensen T., Morr M., Milkereit G. and **Guzman C. A.** Use of glycolipids as adjuvants (Verwendung der Glycolipide MAL-1,3-C14 als Adjuvantien). EP06018723.4 (filed 07.09.2006). PCT/EP 2007/007794
- 2006** **Guzman, C. A.**, Becker P., Nörder M., Drexler I., and Erfle V. Use of MVA as adjuvant in the stimulation of APC's. EP06121795.6-122 (filed 05.10.2006)
- 2007** Drexler I., Kastenmueller W., Gasteiger G., **Guzman, C. A.**, Becker P., Nörder M., and Erfle V. VV promoter-driven overexpression of recombinant antigens. EP07117296.9 (filed 26.09.2007). PCT/EP2008/008223
- 2009** Ebensen T., **Guzman C. A.**, Morr M., and Tegge W. Lipopeptide- and lipoprotein-conjugates as its use. EP09016050.8 – 1216 (filed 28.12.2010).
- 2010** Lehr C-M., Hansen S., Friedrich U., and **Guzman C.A.** Method for vaccination. US Provisional 61/332,289 (filed 07.05.2010)

## Grants

PhD: PhD. Student; PD: Postdoc; TA: technician)

Project title	Funding Agency	Period	Role and Resources Awarded
Live vaccines to trigger mucosal immunity: comparison between <i>Shigella</i> , <i>Salmonella</i> and streptococci as carrier strains for recombinant antigens of pathogenic microorganisms, 01 KX 961	BMBF	1996-1997	PI DM 400,000
Systems for identification of genes of parasitic bacteria that are activated during infection of human host cells	Ministry of Science and Culture of Lower Saxony	1997-1998	PI DM 54,000
Acciones Integradas Hispano-Alemanas "Infection of dendritic cells by the intracellular bacterial pathogens <i>B. bronchiseptica</i> , <i>L. monocytogenes</i> , and <i>S. typhimurium</i> . ; cooperation with the Departamento Envolturas Celulares, Centro de Biología Molecular, "Severo Ochoa", Facultad de Biología, Univ. Autónoma de Madrid, Spain	DAAD	1997-1999	PI Travel and lodging expenses
Development of vaccination strategies against human papilloma virus (HPV) Weiß, Guzman, Hansjorg Hauser, Wehland	HGF Strategiefonds	1998-2001	Co-PI DM 973,000

Development of a mucosal vaccine against <i>Haemophilus influenzae</i> (typeable and non-typeable strains); cooperation with Children Hospital Ricardo Gutierrez, Buenos Aires, Argentina	WTZ/BMBF	2000-2003	PI Travel and lodging expenses
Development of a map of vaccine research and relevant technology platforms in Germany	BMBF	2000-2001	PI DM 400,000
Multi-component <i>Salmonella</i> live vaccines: optimizing molecular, cellular and immunological parameters to enhance vaccine safety and immunogenicity (QLK2-CT-1999-00310)	EC	2000-2003	PI € 265,920
Development and validation of a DNA-chip technology for the assessment of the bacteriological quality of bathing and drinking water	EC	2001-2004	Co-PI € 906,000
Development of a technology platform for antigen delivery by mucosal route	Industry	2001-2003	PI € 500,000
Optimization of host immune responses against vaccine antigens	DFG	2001-2003	PI 1 PD, DM 57,000
Comparative genome analysis of <i>Bordetella</i> spp.	BMBF	2002-2004	PI € 90.224
Optimization of host immune responses against vaccine antigens	DFG	2003-2005	PI 1 PD, € 35,000
AIDS Vaccine Integrated Project (EC Life Sciences, Genomics and Biotechnology for Health - Confronting the major communicable Diseases linked to poverty)	EU	2003-2007	PI € 200,000
Impuls-Fonds des Präsidenten der HGF	HGF	2004	PI €30,000
Project group „ <i>Bordetella</i> “ (Teilprojekt GenoMik – Competence Center for Genome Research of Pathogenic Bacteria “Pathogenomik”).	BMBF	2004-2006	PI € 106,594
Evaluate the efficacy of candidate vaccine antigens in a mouse experimental mucosal infection model	Industry	2004-2009	PI € 250,000
Optimization of host immune responses against vaccine antigens	DFG	2005-2007	PI 1 PhD, € 30,000
International PhD Programme in Infection Biology (MIDITRAIN)	EC	2004-2008	Assoc-Inv 1 PhD, plus € 18,000/year
GBF-Laboratory in the context of the NoE “EuroPathoGenomics”	EC	2005-2010	Assoc-Inv Expenses for travel and training
Cooperation and Service Contract “Development of a mucosal vaccine against a viral pathogen”	Industry	2005	PI € 75,000
Grand Challenges in Human Health “Development of humanized mice to evaluate vaccines against HCV, HIV”	BMGF	2005-2011	Co-PI US\$ 3,155,761



International Graduate College “Strategies of human pathogens to establish acute and chronic infections” between the Medical School of Hanover, the GBF, the Karolinska Institute (Stockholm) and the Swedish Institute for Infectious Disease Control	DFG	2006-2009	PI 1 PhD, plus approx € 10,000/year and travel expenses
Efficacious vaccine formulation system for prophylactic control of influenza pandemics (PANFLUVAC)	EC	2007-2011	PI € 215,300
Assessment of human health impacts from emerging microbial pathogens in drinking water by molecular and epidemiological studies (HEALTHY-WATER)	EC	2007-2009	Co-PI € 726,000
Role of dendritic cells and T cells during the therapy of chronic Hepatitis C with interferon	BMBF	2007-2009	PI € 13,336 and travel expenses
Excellence cluster “Rebirth” – JRG Tolerance	DFG	2007-2011	€ 300,000
The immunogenicity and protective efficacy of plant-derived influenza H5N1 vaccine in preclinical models	Norwegian Research Council	2008-2010	Assoc-Inv NOK 418,000
Novel strategies to combat cholera, hepatitis C and leishmaniasis	Indo-German Science Center for Infectious Diseases	2007-2011	PI € 450,000
European Network of Vaccine Research and Development (TRANSVAC)	EC	2009-2012	PI € 577,460
A dual antigen synthetic peptide subunit vaccine approach to prevent streptococcal associated cardiovascular disease	NHMRC – Australia ID=613616	2010-2012	\$582,450 Co-PI
POLMITRANSVAC “pollen mimetic transcutaneous vaccination” Grand Challenge Exploration Grant (OPP1015136)	Bill and Melinda Gates Foundation	2010-2011	US\$ 50,000
Development and testing of prophylactic and therapeutic vaccine candidates against Chagas disease (ARG 10/005)	BMBF	2011-2012	PI € Travel expenses
A systems biology-driven approach to unravel and revert the mechanisms responsible for poor immune responses in the elderly (GerontoShield)	BMBF-Gerontosys2	2011-2014	Coordinator EUR 2,667,000 (HZI EUR 1,250,000)
Development of a hepatitis C vaccine by targeted delivery of nanogel RNA-replicon constructs (HCVAX)	EuroNanoMed	2011-2014	PI EUR 511,000
PETRA (Platform for efficient transport of pharmaceutical application through innovative particle carrier systems – Plattform für effizienten epithelialen Transport für pharmazeutische Applikationen durch innovative partikuläre Trägersysteme)	BMBF	2011-2014	Co-PI EUR 54,000
Self-replicating RNA vaccine against hepatitis C virus genotype 2. Targeted to dendritic cells (HCRus)	ERA.Net RUS	2011-2013	PI EUR 100,000
Role of chronic infection in metabolic dysfunction. “Metabolic Dysfunction” Cross Program Activity of the Helmholtz Association	Helmholtz Association	2012-2016	PI EUR 570,000

A “Universal” Influenza Vaccine through Synthetic, Dendritic Cell-Targeted, Self-Replicating RNA Vaccines (UNIVAX)	EC	2013-2018	PI EUR 618,000
Host response to vaccination. “Individualized Medicine” Cross Program Activity of the Helmholtz Association	Helmholtz Association	2013-2017	PI Budget under discussion

PI: principal investigator; Assoc-Inv: associated investigator.

## PhD and Diplom students (1995-2013)

### PhD Theses supervised

Name	Title	Year
Ständner, Lothar	Controlled expression of virulence factors from <i>Bordetella pertussis</i> for the development of acellular and live attenuated vaccines	1995
Tzschaschel, Barbara	Secretion of proteins fused with the hemolysin export signal by attenuated vaccine carrier strains: construction of vaccine candidates against <i>Shigella dysenteriae</i> 1 and pig-pathogenic <i>Escherichia coli</i>	1996
Klee, Silke	Construction and characterization of monovalent and bivalent vaccine candidates against shigellosis based in an attenuated <i>Shigella flexneri</i> strains which express the O-antigen from <i>S. dysenteriae</i> 1	1996
Jungnitz, Heidrun	Identification and cloning of genes, which are involved in the intracellular survival of <i>Bordetella bronchiseptica</i>	1999
Kresse, Andreas	Identification and characterization of new virulence factors from the Pathogenicity Island from the Enterohaemorrhagic <i>Escherichia coli</i>	1999
Basso, Holger	Identification and characterization of a new gene from <i>Salmonella typhi</i> , which is activated upon infection of eukaryotic cells: construction of <i>in vivo</i> -activated expression systems and validation of their usefulness for vaccine development	2000
Schulze, Kai	Development of strategies to modulate the immune responses elicited following antigen administration by the mucosal route	2002
De Domenico, Carola	Use of bacteria as delivery systems for vaccination by the oral route (Impiego di “delivery systems” batterici nella vaccinazione per via orale)	2003
Borsutzky, Stefan	Functional characterization of the lipopeptide MALP-2 from <i>Mycoplasma fermentans</i> as new mucosal adjuvant	2004
Becker, Pablo Daniel	New vaccination strategies based on novel adjuvants and delivery systems	2007
Beata Zygmunt	Tissue imprinting and cell migration: influence of the route of immunization on the immune response	2008
Cristina Mastini	Electroporation, adjuvants and chimeric plasmids as critical factors in anti-tumour DNA vaccine	2007
Tetyana Yevsa	Development of attenuated derivatives of <i>Bordetella bronchiseptica</i> and validation as live vaccine strains	2009
Miriam Nörder	Role of non-hematopoietic cells in immune responses	2010
Peggy Riese	Effector functions of bis-(3',5')-cyclic dimeric guanosine monophosphate on the innate immune system & characterization of human NK cell development	2010
Rimma Libanova	Characterization of the underlying mechanisms of adjuvanticity of cyclic di-nucleotides	2012
Kirsten Scholz	New immunization strategies via mucosal route: comparative analysis of sublingual, intravaginal and intranasal immunization	2012

Sebastian Weißmann	Tailoring T helper 17 induction following vaccination by antigen dosage and adjuvant usage	2012
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### **Ongoing PhD Theses**

<b>Name</b>	<b>Title</b>	<b>Period</b>
Stephanie Trittel	Identification of immune modulators acting on NK and NKT cells to improve vaccine development	Since 2011
Ivana Škrnjug	Identification of molecular mechanisms mediating the adjuvanticity of cyclic di-nucleotides	Since 2011
Alex Cabrera-Nunez	Advanced mouse models for preclinical validation	Since 2009
Neha Vashist	Dissecting innate immune players and their interaction with virus infected cells to improve vaccine design	Since 2012
Shiwani Agarwal	Dissecting the immunotherapeutic properties of innate IL-17 producing cells	Since 2013

### **Diploma/Master Theses supervised**

<b>Name</b>	<b>Title</b>	<b>Year</b>
Frahm, Nicole	Expression of T cell epitopes from Ras in <i>Listeria monocytogenes</i> carrier strains	1996
Zock, Angela	Live vaccines against <i>Streptococcus pyogenes</i> : expression of the SfbI protein in <i>Streptococcus gordonii</i>	1997
Schulze, Kai	Identification and characterization of virulence factors from EHEC	1997
Toppel, Antonia	Development and characterization of attenuated <i>Salmonella typhimurium</i> vaccine carrier strains against <i>Onchocerca volvulus</i> based in the use of the GST1, GST2 and S1 proteins	1999
Felk, Sandra	MALP-2-mediated effects on antigen uptake, processing and presentation	2004
Peggy Riese	Evaluation of the immune-modulatory properties of alfa-Gal-ceramide and its potential as adjuvant	2006
Miriam Nörder	Optimizing the use of Modified Vaccinia Virus Ankara (MVA) for vaccine development	2006
Rimma Libanova	Characterisation of the effector functions of novel adjuvants	2008
Daniela Bruhm	Identification and characterisation of novel adjuvants co-administered by mucosal or parenteral route	2008
Michaela Annemann	Characterisation of the novel adjuvants PQS and PQSMPEG	2009
Janette Beshay	Characterisation of 2,3,4,2'-trehalose tetraester as candidate adjuvant	2010
Jana Corradi	Sublingual vs. Intranasal Immunization: an alternative approach for the administration of vaccines	2011
Anne Kolenbrander	Defining the role of IL-17 secreting cells in vaccine design	2013

### **Ongoing Diploma Theses**

<b>Name</b>	<b>Title</b>	<b>Period</b>

### **Teaching Activities:**

Seminars (S), Practical Courses (P), Tutorial (T)

<b>Title</b>	<b>Type</b>	<b>Level</b>	<b>Location/frequency</b>
Course of Microbiology, Virology and Parasitology	P, S, T	Undergraduate/ Graduate	Microbiology Department, School of Medicine, National University of Rosario (Argentina) 1982 to 1986
General Microbiology	S	Undergraduate	Faculty of Biological Sciences, University of Genova (Italy) 1988 to 1989
Microbiology	S	Undergraduate	Faculty of Medicine, University of Genova (Italy) 1989, 1992, 1993
Microbiology Specialization School	S	Graduate	Faculty of Medicine, University of Genova (Italy) 1989, 1992, 1993
Microbiology Laboratory	P	Undergraduate	University of Genova (Italy) 1989, 1992, 1993
Microbiology (block M24)	P	Undergraduate	Biotechnology, Technical University of Braunschweig / 1996/97
Medical Microbiology and Immunology	P	Undergraduate	Medical School of Hannover / WS 1998/99
Immunizations and Vaccines	S	Undergraduate	Medical School of Hannover / Summer Semester 2000/2001
Molecular Vaccinology – New implications for Preventive and Therapeutic Interventions (Elective Course)	S	Undergraduate	Medical School of Hannover / 2001/2002
Medical Microbiology and Immunology	P	Undergraduate	Medical School of Hannover / 2003
MD/PhD program in Molecular Medicine “Vaccinology: basis on vaccine development and vaccination strategies”	S	Postgraduate	Medical School of Hannover / Since 2003
MD/PhD program in Molecular Medicine “Vaccinology: basis on vaccine development and vaccination strategies”	T	Postgraduate	Medical School of Hannover / Since 2003
German Coordinator and Member of the Board for the International Doctorate in “Experimental Oncology” (Univ. Ferrara- Italy, Karolinska Institute-Sweden and GBF-Germany)	P, S, T	Postgraduate	2003-2007
International Graduate College IRTG1273 (Strategies of human pathogens to establish acute and chronic infections). “Basic concepts in Vaccinology”	S	Postgraduate	Medical School of Hannover / 2009-2013
Characterization of humoral and cellular immune responses induced by mucosal and parenteral vaccination	P	Posgraduate	Medical School Hannover/HZI Since 2010