

International MD/PhD Program “Molecular Medicine”

- Chairman: Prof. Dr. Reinhold E. Schmidt
- Vice Chairman: Prof. Dr. Achim Gossler
- Scientific coordinator: Dr. Susanne Kruse

Profile

The international MD/PhD program at the Medical School Hannover (MHH) started in October 2000 (beginning of winter semester 2000/2001). The MD/PhD Program offers an interdisciplinary project-orientated postgraduate education for medical students as well as students from life sciences. Students learn how to carry out thorough and independent scientific work while doing their own 3-year research project, and, thus, earn a further qualification for the performance of tasks in research and teaching. The program is designed for German as well as international PhD students. The whole program is in English. Besides the individual research projects, it comprises of obligatory seminars and tutorials, which deal with basics and methods in Biology and Medicine (in the first year), and then on more applied aspects through seminars on current research projects in the MHH (in the second year). Furthermore, students attend a large catalogue of project-orientated and interdisciplinary seminars/courses, including guest seminars, scientific colloquia, practical method courses, and seminars in “Ethics”, “Animal experiments”, “Scientific Writing”, “Presentation techniques” etc.

The main focus lies on the scientific research project in “Molecular Medicine”, carried out in one of the departments of the MHH, especially in one of main research fields: Immunology; Infection; Oncology and Differentiation; Genetics and Cell Biology (see lists below and please, refer to the individual departments). Numerous cooperations with outstanding scientists and institutes guarantee the scientific excellence of the program. Short-term stays abroad within the scope of cooperations and projects are desired (including the Emmy-Noether-Program) as well as the invitation of guest lecturers/scientists.

The medical students in this program receive more in-depth education in life sciences, especially in molecular medicine, whereas the students from natural sciences receive an education in the basics of medicine. The MD/PhD program is highly attractive for foreign students and, moreover, supports the international experience of the Germans. On December 9th, 2003 the program has been accredited according to European standards (ZEvA, Hannover; ECTS) as the first PhD program in Germany.

Since October 2003, the MD/PhD program is one of the key programs of the Hannover Biomedical Research School (HBRS).

Further information: www.mh-hannover.de/hbrs.html.

Current status

The MD/PhD program has been supported by the DAAD/DFG ["International Postgraduate Program" (IPP or PHD)] since January 2002 till December 2006. This enabled to: appoint a scientific coordinator (Dr. Susanne Kruse), appoint German Teachers (Petra Marotz, Andre Brana), appoint undergraduate students on an hourly basis, and have resources for marketing, travel, invitations of guest scientists etc. available.

From January 2007, the MD/PhD program „Molecular Medicine“ will be supported by funds from the German Excellence Initiative, through the Hannover Biomedical Research School (HBRS).

At the moment, there are 73 students in the program [36 female and 37 men; 51 from abroad and 22 Germans; 18 medical students (including veterinary) and 55 students from life sciences]. The students are financed by the respective departments (see there) or by grants (HBRS, DAAD, Industry etc.).

In 2006, the MD/PhD program "Molecular Medicine" achieved financial support by the DAAD for student grants in the "Matching Fund" program line (35.000,- Euro).

In October 2006, orientation weeks were organized for the fourth time, for all new students of the the HBRS, mainly the MD/PhD program "Molecular Medicine" and PhD program "Infection Biology", supported by the WIN program (Welcome in Niedersachsen; 10.000,- Euro) and DAAD (STIBET, 4.380,- Euro).

In 2006, the MD/PhD program received 410 applications.

Cooperations exist with: the TiHo Hannover, the Fraunhofer Institute of Toxicology and Experimental Medicine, the Helmholtz Center for Infection Biology Braunschweig, the Institute of Animal Breeding Mariensee, the Centre of Stem cell research Gatersleben, and the University Hannover.

The MD/PhD program takes a leading role in the network of biomedical PhD programs in Germany.

On June 9th, 2006 and on November 10th, 2006, seven and nine students successfully passed their final exams (public defense, international board of examiners).

Publications

Scientific: please, refer to the respective departments

Dissertations (PhD theses)

1.) Final exams (PhD), June 9th 2006, students (f=female, m=male, MD=medical degree + Dr.med. in case of German students, VetD= veterinary degree, L.Sc.=life science degree):

Diya Abraham (f, L.Sc., India): Functional analyses of the role of PKCg in the mammalian circadian clock (Max-Planck Institute, Prof. Dr. Eichele)

Christoph Happel (m, MD, Germany): Evaluating the opportunities of homologous recombination events in hematopoietic stem cells

(Pediatric Hematology and Oncology, Prof. Dr. Klein)

Yijiang Li (m, MD, China): Suppression of MHC II upregulation by HMG-CoA reductase inhibitors in an allogeneic model of rat lung transplantation (Thoracic and Cardiovascular Surgery, PD Dr. Simon), final exam on June 9th, 2006

Wang Linding (m, MD, China): Transposon and targeted mutagenesis of a recombinant KSHV genome to identify viral genes required for replication in endothelial cells (Virology, Prof. Dr. Schulz)

Vladimira Jakubcakova (f, L.Sc., Slovakia): The role of PKC alpha in circadian rhythms (Max Planck Institute, Prof. Dr. Eichele), final exam on June 9th, 2006

Krishna Kumar Singh (m, L.Sc., India): Disease-related variants of ARMD and functional implications (Human Genetics, Prof. Dr. Schmidtke)

Manvendra Kumar Singh (m, L.Sc., India): Molecular analysis of somite patterning (Molecular Biology, Prof. Dr. Kispert)

2.) Final exams (PhD), November 10th 2006, students (f=female, m=male, MD=medical degree + Dr.med. in case of German students, VetD= veterinary degree, L.Sc.=life science degree):

Khaled Alkharsah (m, L.Sc., Syria): Viral and genetic determinants of KSHV/HHV8 transmission from mothers to children (Virology, Prof. Dr. Schulz)

Georg Bohn (m, MD, Germany): Generation and characterization of hematopoietic stem cell lines as novel tools to investigate genetic

and developmental aspects of congenital bone marrow failure syndromes (Pediatric Hematology and Oncology, Prof. Dr. Klein)

Tammy Chang (f, L.Sc., Taiwan/Germany): *Pseudomonas aeruginosa* – mammalian host cell interaction: Phagocyte-sensitizing genes of *P. aeruginosa* (Pediatrics, Prof. Dr. Tümmler)

Anuhar Chaturvedi (m, L.Sc., India): The use of RNA interference in hematopoietic stem cells for functional genomics (Hematology and Oncology, Prof. Dr. Eder)

Shipra Gupta (f, L.Sc., India): Generation and characterization of chemokine-derived peptides leading to the inactivation of chemokines (Pharmacology, Prof. Dr. Forssmann)

Shashi Kant (m, L.Sc., India): Mechanisms of activation and substrate targeting in the MAPkinase cascades (Physiological Chemistry, Prof. Dr. Gaestel)

Anika Meyerholz (f, MD, Germany): The function of the abnormally expressed endocytic protein CALM in hematopoietic malignancies (Cell Biology, Prof. Dr. Ungewickell),

Gesa Meyer (f, VetD, Germany): Pro-inflammatory effects of the *Clostridium difficile* toxins A and B (Toxicology, Prof. Dr. Just), final exam on June 9th, 2006

Rahul Purwar (m, L.Sc., India): T cell - keratinocyte interaction in chronic inflammatory skin diseases (Dermatology, Prof. Dr. Werfel)

V. Students (f=female, m=male, MD= medical degree + Dr.med. in case of German students, VetD= veterinary degree, L.Sc.=life science degree)

1. class 2002 students:

Aravind Sekhar (m, MD, India): Functional

characterization of genes specifically expressed in intestine epithelium (Molecular Biology, Prof. Dr. Gossler), final exam 2007

2. class 2003 students:

Dorothea Dijkstra (f, L.Sc., the Netherlands): Interaction between anaphylatoxins C3a/C5a and T-lymphocytes/ dendritic cells with relevance for inflammatory skin diseases (Dermatology, Prof. Dr. Werfel), final exam 2007

Dorothea Gadzicki (f, MD, Germany): Identification of diagnostic and prognostic markers for hereditary breast cancer by micro-array and proteome analysis (Molecular Pathology, Prof. Dr. Schlegelberger), final exam 2007

Jaba Gamrekelashvili (m, MD, Georgia): Influence of tumor cell death on antitumor activity of the immune system (Gastroenterology, Hepatology and Endocrinology, PD Dr. Greten), final exam 2007

Arnab Gosh (m, MD, India): Mechanisms and modulation of anti-leukemia immunity (Pediatric Hematology and Oncology, PD Dr. Sauer), final exam 2007

Eric Hesse (m, MD, Germany): Gene-expression analysis of mesenchymal stem cells and their matrix synthesis (Trauma Surgery, Prof. Dr. Krettek), final exam 2007

Kumaravelu Jagavelu (m, L.Sc., India): Involvement of the p38-MK2 signalling pathway in arterogenesis (Cardiology, Prof. Dr. Schieffer/ Dr. Bavendiek), final exam 2007

Gustavo Salguero Lopez (m, MD, Columbia): Impact of biomechanic stretch on progenitor cell difference: role of progenitor cells in vessel neovascularization (Cardiology, Prof. Dr. Schieffer), final exam 2007

Harini Nivarthi (f, L.Sc., India): Molecular analysis of transcription factors involved in dendritic cell development (Pediatric Hematology and Oncology, Prof. Dr. Klein), final exam 2007

Andri Pramono (f, L.Sc., Indonesia): In vitro hematopoietic differentiation of rhesus monkey embryonic stem cells (Pediatric Hematology and Oncology, Prof. Dr. Welte), final exam 2007

Bishnudeo Roy (m, L.Sc., India): Bacteria-mediated DNA vaccination and immunomodulation (GBF Braunschweig, Prof. Dr. Weiss), final exam 2007

Tibor Veres (m, MD, Hungary): Interaction between pulmonary dendritic cells and nerves during allergic inflammation (Fraunhofer Institute for Toxicology and Experimental Medicine, Dr. Braun), final exam 2007

Anastassia Vertii (f, L.Sc., Ukraine/Turkey): Search for biological functions of HSPs using knockout mice (Physiological Chemistry, Prof. Dr. Gaestel/ Dr. Kotlyarov), final exam 2007

3. class 2004 students:

Rannar Airik (m, L.Sc., Estonia): Molecular analysis of Tbx18 mutant (Molecular Biology, Prof. Dr. Kispert)

Abdul Mannan Baru (m, L.Sc., India): Roads to presentation: Targetting the pathways in antigen uptake to dissect out mechanisms for cross presentation (Clinical Immunology, Prof. Dr. Behrens)

Sangeeta Chauhan (f, L.Sc., India): Regulation of the turn-over of mitotic cyclins like cyclin B or cyclin A by proteolytic mechanisms and role in the development of human malignancies (Gastroenterology, Hepatology and Endocrinology, Dr. Malek)

Mingmin Chen, (f, L.Sc., China): The function of PDZ domain proteins in ion transport and the signal pathways by regulated cytoproteins (Gastroenterology, Hepatology and Endocrinology, Prof. Dr. Seidler)

Prajeeth C.K., (m, L.Sc., India): Constitutive and induced antigen presentation of exogenous antigens by dendritic cells (Clinical Immunology, Prof. Dr. Behrens)

Kursheed Iqbal, (m, L.Sc., India): Reprogramming and re-differentiation of somatic cells (FAL Mariensee, Prof. Dr. Niemann)

Joanna Jagielska (f, L.Sc., Poland): Functional role of TNF-receptor associated factors (TRAF) for proinflammatory processes in vascular cells (Cardiology, Prof. Dr. Schieffer/ Dr. Bavendiek)

Adan Chari Jirmo, (m, L.Sc., Kenia): Assessment and modulation of CD8+T cell responses to HSV-1 epitopes for induction of effective CTL-immunity (Clinical Immunology, Prof. Dr. Behrens)

Gamze Kabalak, (f, L.Sc., Germany/Turkey): Study of the autoimmune disorder Sjögren's syndrome considering genetic disposition as well as the function of an immunoglobulin-like transcript possibly involved in the disease (Clinical Immunology, PD Dr. Witte)

Nonsikelelo Mpfu, (f, L.Sc., Zimbabwe): Antigen-specific, Foxp3-transduced T cells for therapy of type I diabetes (Gastroenterology, Hepatology and Endocrinology, Dr. Jaeckel)

Frederick Onono, (m, L.Sc., Kenia): Ras Signaling (Hematology and Oncology, PD Dr. Reuter)

Erkembulgan Purevdorj, (m, MD, Mongolia): ErB4 in fetal surfactant synthesis (Pediatrics, Dr. Dammann)

Aaheli Choudry Roy, (f, L.Sc., India): Analysis of the sequence of telomere dysfunction followed by telomerase activation during aging and carcinogenesis (Gastroenterology, Hepatology and Endocrinology, PD Dr. Rudolph)

Jessica Schwermann, (f, L.Sc., Germany): Interaction between the p38 MAP kinase signaling cascade and Polycomb group proteins: analysis of function and structure of MK2-Edr Polycomb complexes (Physiological Chemistry, Prof. Dr. Gaestel)

Meera Shah, (f, L.Sc., India): Structure-function analysis of regulatory mRNA cis-elements (Physiological Chemistry, Prof. Dr. Holtmann)

Anurag Singh (m, L.Sc., India): Signalling mechanism(s) of *Helicobacter pylori* VacA cytotoxin and disturbance of epithelial secretory and immune functions (Gastroenterology, Hepatology and Endocrinology, Prof. Dr. Seidler)

Kirsten Sommer (f, MD, Germany): Chlamydia and complement (Medical Microbiology, Prof. Dr. Klos)

Leena Srivastava, (f, L.Sc., India): Structural and functional studies of actin-binding proteins at the nuclear envelope (Biophysical Chemistry, Dr. Korenbaum)

Basant Thakur (m, L.Sc., India): Isolation and characterization of mRNA-protein complexes involved in the control of mRNA stability (Physiological Chemistry, Prof. Dr. Holtmann)

Murat Ünal (m, MD, Germany/Turkey): Lateral Inhibition by BMP Morphogens on LEF/TCF-mediated Differentiation (Pediatric Hematology and Oncology, Prof. Dr. Welte)

Fei Zhao (m, L.Sc., China): Role of CD4+CD25+ T cells in inhibition of tumor specific immune

responses in conjunction with a cancer vaccine approach, particularly in HCC cells/patients (Gastroenterology, Hepatology and Endocrinology, PD Dr. Greten)

4. class 2005 students:

Matthias Christgen (m, MD, Germany): Isolation and characterization of clonogenic breast cancer cells (Pathology, PD Dr. Lehmann/ Prof. Dr. Kreipe)

Priyanka Dutta (f, L.Sc., India): Identification of cellular cofactors required for myeloid differentiation (Hepatology and Oncology, Prof. Dr. Scherr/ Prof. Dr. Eder)

Ursula Ehmer (f, MD, Germany): Genetics and metabolism: characterization of individual genetic variation of UDP-glucuronosyltransferase regulation in a mouse model (Gastroenterology, Hepatology and Endocrinology, Dr. Strassburg)

Luis Guachalla Gutierrez (m, L.Sc., Bolivia): Analysis of the role of stanniocalcins genes and apoptosis pathways during cellular and organismal ageing (Gastroenterology, Hepatology and Endocrinology, PD Dr. Rudolph)

Lydia Asrat Haile (f, L.Sc., Ethiopia): T cell based therapies in a mouse model of colitis associated colon cancer (Gastroenterology, Hepatology and Endocrinology, PD Dr. Greten)

Harshvardhan (m, L.Sc., India): Functional analysis on the role of telomere shortening for the progression of Alzheimer disease and functional characterization of Lipocalin 2 in liver regeneration (Gastroenterology, Hepatology and Endocrinology, PD Dr. Rudolph)

Henoch Hong (m, L.Sc., Germany): Innate immunity in HIV-1 infection: impact of HIV-1 on antiviral defense mechanisms (Clinical Immunology, Dr. Heiken/Prof. Dr. Schmidt)

Ananta Paine (m, L.Sc., India): Comprehensive identification of immunotherapeutically targetable peptide antigens for individualized leukemia treatment (Transfusion Medicine, Prof. Dr. Eiz-Vesper/ Prof. Dr. Blasczyk)

Amrita Rai (f, L.Sc., India): Structure and function of dynamin and dynamin-related proteins (Biophysical Chemistry, Prof. Dr. Manstein)

Sumit Rathore (m, L.Sc., India): Pathogenic role of granulocytes in allergic inflammatory skin diseases and their modulation by anti-inflammatory drugs (Dermatology, Prof. Dr. Wedi)

Mathias Rhein (m, L.Sc., Germany): The role of neurotrophin receptors in acute leukemia (Experimental Cell Therapy, Prof. Dr. Baum)

Reena Singh (f, L.Sc., India): Functional analysis of Tbx gene in heart development (Molecular Biology, Prof. Dr. Kispert)

Inga Sörensen (f, L.Sc., Germany): Analysis of Dll1 function in the vascular system (Molecular Biology, Prof. Dr. Gossler)

Ratnesh Kumar Srivastav (m, L.Sc., India): Studying the regulation and function of protein SUMOylation (Physiological Chemistry, Prof. Dr. Gaestel/Dr. Niedenthal)

Ujala Srivastava (f, L.Sc., India): Production and characterisation of Est1 knockout mouse. Role of Rad9/Hus1 in senescence signalling (Gastroenterology, Hepatology and Endocrinology, PD Dr. Rudolph)

Kathrin Steinwede (f, L.Sc., Germany): Role of lysosomal cathepsins in mycobacterial infections of the lung (Pneumology, PD Dr. Maus)

Shazad Nawaz Syed (m, L.Sc., India): Analysis of coupling mechanisms between Fc receptor and complement in mouse models of autoim-

mune diseases (Clinical Immunology, Prof. Dr. Gessner)

Dong Wang (m, MD, China): Pathogenic role of keratinocytes in cutaneous lupus erythematosus (Dermatology, Prof. Dr. Wittmann)

Alexander Wolf (m, L.Sc., Germany): Analysis of the mechanisms by which the yersinia enterocolitica virulence factor Yop.P inhibits host cell protein kinases (Pharmacology, Prof. Dr. Kracht)

Katja Zscheppang (f, L.Sc., Germany): ErbB4 receptor activation, trafficking, and function in fetal lung type II cells (Pediatrics, Dr. Dammann)

5. class 2006 students:

Hengameh Abdollahpour (f, MD, Iran): Different functions of transcription factor Gfil (Pediatrics, Prof. Dr. Klein)

Nora Anderson (f, MD, Germany): NMR- and MS-based metabonomic approaches to assess biomarkers of liver toxicity (ITEM/Pharmacology, Prof. Dr. Borlak)

Arpita Baisantray (f, L.Sc., India): Analysis of functional consequences of the deletion of candidate genes of the DNA damage pathway; analysis of a telomerase activating compound in improving liver regeneration (Gastroenterology/Hepatology/Endocrinology; PD Dr. Rudolph)

Hari Balaji (m, L.Sc., India): Autoallergic T cell responses in atopic dermatitis (Dermatology, Prof. Dr. Werfel)

Anne Gompf (f, L.Sc., Germany): Investigation of telomere dysfunction-induced environmental changes and their influence on hematopoietic stem cell function and engraftment (Gastro-

enterology/Hepatology/Endocrinology; PD Dr. Rudolph)

Maria Gschwandtner (f, L.Sc., Austria): Investigation of the role of histamine receptor 4 (H4R) in comparison to other histamine receptors in allergic inflammation of the skin (Dermatology, Prof. Dr. Werfel)

Kshama Gupta (w, L.Sc., India): Structural and functional characterisation of unconventional myosins from Dictyostelium discoideum (Biophysical chemistry, Prof. Dr. Manstein)

Dhivya Haridass (w, L.Sc., India): Generation of a functional mouse model with a human immune system and human liver cells for the study of HCV pathogenesis and therapy; study of the functional ability of bone marrow derived stem cells in the repair of endothelial cell damage in liver (Gastroenterology/Hepatology/Endocrinology; Prof. Dr. Ott)

Niels Heinz (m, L.Sc., Germany): Evaluation of retroviral vectors for conditional transgene expression (Experimental Hematology, Prof. Dr. Baum)

Wolfgang Koestner (m, MD, Germany): Silencing alloreactivity by leukaemia-specific T cell receptor (TCR) gene transfer (Pediatric Hematology and Oncology, Dr. Sauer)

Snehlata Kumari (w, L.Sc., India): Molecular analysis of cell-mediated C5a generating pathway as potential new trigger of the pulmonary type III allergic response in mice (Clinical Immunology, Prof. Dr. Gessner)

Tobias Mätzig (m, L.Sc., Germany): Evaluation of retro- and lentiviral vectors for gene therapy of hematopoietic cells (Experimental Hematology, Prof. Dr. Baum)

Manoj B. Menon (m, LSc., India): Characterisation of p38 MAPK regulated gene expression in MK2/3 deficient cells (Biochemistry, Prof. Dr. Gaestel)

Nidhi Narain (w, LSc., India): Standardised human mesenchymal stem cells for regenerative medicine (Gastroenterology, Prof. Dr. Ott)

Natalie Naue (w, LSc., Germany): Protein-protein and protein-DNA interactions at the DNA replication fork of *E. coli* (Biophysical Chemistry, Prof. Dr. Manstein)

Daniel Poehnert (m, MD, Germany): The RT12 protein, a putative ligand for the rat's natural killer cell receptor NKR-P1B (Visceral Surgery, Dr. M. Koch)

Wilhelm Walter (m, LSc., Germany): Motor mechanics of the motor domain of cytoplasmic dynein (Physiology Chemistry, Dr. Steffen)

Kristina Wiege (w, LSc., Germany): Inhibitory G-Proteins in the control of C5aR expression and functioning (Clinical Immunology, Prof. Dr. Gessner)

Xiangyue Zhang (w, MD, China): The role of lymphoid tissue stromal cells in the functional organization of lymphoid organs (Immunology, Prof. Dr. Förster)