Erasmus MC
Graduate School

from knowing
to growing

Ever thought of research?

- Health Sciences
- Clinical Research
- Molecular Medicine
- Neuroscience
- Infection & Immunity

Introduction

Almost daily, the media report on developments in medical science. New technologies combined with original research generate novel insights that are then applied in medical practice and health care.

Erasmus MC participates in a wide range of research fields, both nationally and internationally. At Erasmus MC, scientific training is an important aspect of the education of future academic medical practitioners, preparing them for a profession in which both knowledge and technical skills are continually changing and expanding.
Students who have completed their Research Master Program and obtained their Master of Science degree have an excellent starting position to undertake PhD research.

Research Master Programs

The Research Master Programs provide students with a high level scientific training in fields of basic research or general health care. The programs last two years. For medical students of Erasmus MC the program is adapted and runs parallel with their medical program. Upon successful completion of a program, students will be awarded an internationally acknowledged Master of Science degree.
Erasmus MC offers five officially accredited Research Master Programs. These programs present students with the challenge and opportunity to become medical researchers, who can make a contribution to the future advancement of medical science. Qualified students, who seek the challenge of scientific research, may choose from the five Research Master Programs:

- Health Sciences
- Clinical Research
- Molecular Medicine
- Neuroscience
- Infection & Immunity

Motivated and outstanding students can apply to one of the Research Master Programs. The programs are open to medical students as well as to bachelor students from various disciplines, such as life sciences, behavioural sciences, medical sciences and public health sciences. All programs are conducted in English.

For more information please visit our website:
www.erasmusmc.nl/graduateschool

Health Sciences

The Research Master Program in Health Sciences is organized by the Netherlands Institute for Health Sciences (NIHES). It provides students with specialized state-of-the-art scientific knowledge and high-level research skills, indispensable for a successful international career as researcher, executive or advisor in clinical medicine, drug research, public health or health policy development. During this two-year, full-time Master of Science program, students specialize in one of the following disciplines: epidemiology, clinical epidemiology, genetic epidemiology or public health.

The program combines theoretical and methodological training with practical research training, and comprises both compulsory and elective courses. Individual assignments and presentations alternate with group work, discussions and case studies with fellow students. For medical students of Erasmus MC the program is adapted and can be combined with their medical program.

Theoretical training

The program starts with a selection of courses during the renowned Erasmus Summer Programme. This three-week program provides a sound and up-to-date introduction to principles and methods of applied quantitative research in medicine and health care. Key areas are: biostatistics, clinical research, epidemiology, human genetics and health services and public health research. The core curriculum includes courses in study design, data-analysis, biostatistics and clinical-epidemiologic research methods.
Elective courses permit student to tailor the program to their interests and professional needs.

Research training

The research phase involves the design and implementation of a research project under the guidance and supervision of a personal tutor. In most cases the student will work with existing data. Research areas comprise, amongst others: major neurological and cardiovascular diseases, endocrinological determinants of diseases, pediatric studies, end-of-life decisions in medical practice, and social factors affecting access to health care. Successful completion of the research training leads to a paper on the research project that is ready for submission to an international scientific journal.

Netherlands Institute for Health Sciences

Since its foundation in 1991, NIHES has become a leading international centre in its field. Over nineteen years, they've made a number of very significant achievements: identifying the determinants of health and disease, improving the efficiency of health services, and developing methods for acquiring and interpreting medical data.

NIHES offers Master of Science (MSc) programmes in quantitative medicine and health sciences. These include one-year and two-year programmes: a one year full-time or a two year part-time programme in Health Sciences (for students with a Master's degree and some research experience) and a two year full-time programme in Health Sciences (for students with a relevant Bachelor's degree).

NIHES' research training is meant for those who seek a career in medical and public health research, who would like to combine research and clinical work, or who wish to increase their chances of qualifying for a PhD research project. Whatever their ambition, NIHES will provide the right knowledge and expertise!

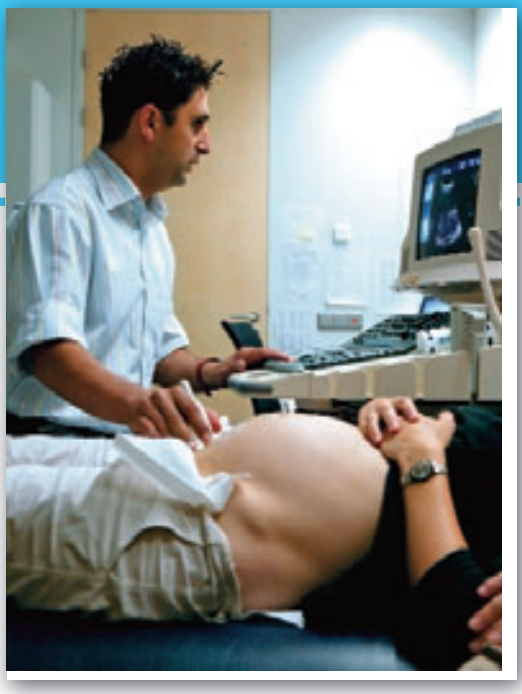
Key information

Applicants should have a Bachelor's degree in a field relevant to the specialization of their choice and the wish to pursue a research career in that field. A letter of motivation is requested as part of the selection procedure for admission.

Do you want to know more?

For more information contact: prof. Albert Hofman, MD, PhD (a.hofman@erasmusmc.nl) or Monique Nuijten (m.nuijten@erasmusmc.nl). Medical students of Erasmus MC can contact Astrid Vrakking, PhD (a.vrakking@erasmusmc.nl). You can also visit our website: www.nihes.nl.

Clinical Research



There is a great need of clinicians who want to combine patient care and research. The **Research Master Program in Clinical Research** is a unique opportunity for clinicians and medical students to become clinical investigators and pursue an academic career. The program aims to train excellent students in research methodology within the clinical context of a wide range of research subjects performed by top-quality research groups at Erasmus MC.

Organized by the NIHES research school, this program is built on partnership with the COEUR research school, the research School Molecular Medicine and the Musculo-skeletal Science Center in Erasmus MC. It offers research opportunities in Endocrinology and Neuro-Endocrine Immunology, Cardiovascular Research, Haemato-Oncology, Medical Oncology, Gynaecologic Oncology, Pediatric Research, Obstetrics, Urology, Transplantation Medicine, Gastroenterology & Hepatology, Surgical Research and Musculoskeletal Science. The programs last two years. For medical students of Erasmus MC the program is adapted and can be combined with their medical program.

Education

- Qualitative and quantitative methodology.
- Orientation on a great number of research programs at the schools and departments mentioned above.
- Acquisition of specific knowledge of one of the specialist areas and preparation of a research protocol.

Research

- Performance of research.
- Writing and presenting the Master of Science thesis.

Clinical researchers seek to provide the answer to two basic questions:

- Firstly, how can we provide the most accurate diagnosis?
- Secondly, how can we offer the most effective treatment to our patients?

Patients are individuals, who differ from each other in many aspects, which may influence the effects of therapy. At the same time one diagnosis often covers many diseases, which also may differ in degree of severity, response to therapy etc. Therefore clinicians have to perform clinical trials and test methods to distinguish subgroups of patients and diseases. The ultimate goal of clinical research is a tailor-made diagnosis and therapy for the individual patient.

Training in clinical research gives students the opportunity to contribute to the achievement of the ultimate goal during their career as a medical professional.

Do you want to know more?

For more information please contact:
prof. Aart-Jan van der Lely, MD, PhD (a.vanderlelij@erasmusmc.nl) or Monique Nuijten (m.nuijten@erasmusmc.nl). Medical students of Erasmus MC can contact Astrid Vrakking, PhD (a.vrakking@erasmusmc.nl).

You can also visit the websites www.nihes.nl.

Molecular Medicine

The **Master of Science in Molecular Medicine** program is a two-year research master's program, focusing on molecular and cellular principles of health and disease. We aim to bring students to the forefront of current developments in biomedical science. You will learn experimental design and technical approaches currently in use, such as cell and tissue culture, live cell imaging, genomic and proteomic technologies, genetic modification, generation of small animal models, and more.

Educational program

Year 1 of the program (60 ECTS) includes the courses 'Molecular and Cell Biology', 'Contemporary Research Topics', 'Evolution and Development', and 'Written and Oral Presentation of Research'. After a set of introductory lab practices, you will perform a research project of 6 months.

Year 2 (60 ECTS) consists of a full-year research project, with additional research-oriented courses and seminars. By the end of the year you will write and present your MSc Thesis. On successful completion of the program you are awarded the MSc Molecular Medicine degree.

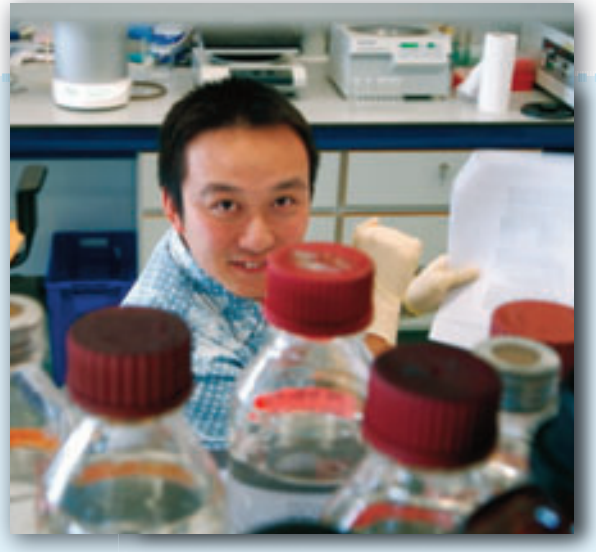
Career perspectives

The MSc Molecular Medicine degree may lead to a career in basic research or a position at a company or institute as a life science researcher. MSc Molecular Medicine graduates with a background in medicine are likely to become successful clinical researchers who are actively involved in the initiation and supervision of basic or translational research projects.

Key information

The program was first offered in 1999; we have accommodated students from abroad since 2006. MSc Molecular Medicine Faculty members are directly involved in basic biomedical research and training, within many different research departments of Erasmus MC, thus reflecting the multi-disciplinary nature of our MSc program.

Affiliated Postgraduate Schools: Medical Genetics Center (MGC) and Molecular Medicine (MolMed). **Involved departments:** Biochemistry, Bioinformatics, Cell Biology, Clinical Genetics, Forensic Molecular Biology, Genetics, Gynaecology and Obstetrics, Hematology, Immunology, Internal Medicine, Orthopaedics, Pathology and Experimental Pathology, Pediatric Endocrinology, Pediatric Surgery, Pediatric Oncology, Pulmonary Medicine, Radiation Oncology, Reproduction and Development, Urology, and Virology.



Exploring the Biomedical Revolution

Imagine: ...stem cells for tissue replacement ... timely detection and therapy of developmental defects ... reprogramming of the genome in treatment of genetic disease and cancer ... genetic profiling and personalized drug design ...

Great discoveries made in the 20th century have laid the foundations for today's advancements in life sciences. Many new insights and therapeutic possibilities may develop as a result of a better understanding of actions and interactions of molecules and cells in development and disease. Would you like to take part?

The MSc program starts every year in September and can be completed in two academic years (120 ECTS). The program is taught in English.

Entry requirements:

- BSc in any of the biomedical sciences (e.g. biology, biochemistry, medicine), or BASc from Dutch higher vocational training program in biomedical laboratory techniques (HBO-BML)
- personal motivation, assessed by written statement and (internet) interview
- satisfactory results on an Entrance Exam
- TOEFL 575 / 232 / 90 or IELTS 6.5, or comparable English proficiency
- Overall performance in previous educational programs

Erasmus MC medical students are offered the possibility to follow Year 1 of the program in three parts, concurrently with the medical curriculum (2nd and 3rd year bachelor, 1st year master). Interested 2nd year medical students are invited to join the orientation sessions from October to December.

Application deadlines:

- Erasmus MC bachelor 2 medical students: December 1 (for enrolment as premaster students)
- BSc and BASc graduates: June 1

Do you want to know more?

The program is organized by prof.dr J. Anton Grootegoed (program director), prof.dr Elaine Dzierzak (chair member), dr. Dik van Gent (chair member), Benno Arentsen (coordinator), and Marjoleine van Berckel Bik (coordinator).

Visit our website for more information: www.erasmusmc.nl/mscmolmed, or contact us by e-mail: mscmolmed@erasmusmc.nl

Neuroscience

The major objective of the **Research Master Program in Neuroscience** is to teach and to provide training for talented students in the rapidly expanding field of Neuroscience. The program prepares students for future fundamental research in various medical fields in which neuroscience becomes increasingly important; these include neurology, neurosurgery, ophthalmology, neuro-oncology, otolaryngology, psychiatry and gerontology. The program combines a broad range of tutorials and workshops in neuro-anatomy, neurophysiology, molecular biology and behavioral neuroscience.

The positioning of this Research Master Program in Neuroscience within the department of Neuroscience of Erasmus MC provides an excellent basis for training in the fundamental Neurosciences. Students will become acquainted with all facets of modern Neuroscience research.

Within the Neuroscience Institute brain functions are studied at many levels varying from individual genes to complex systems, from peripheral nerves to the central nervous system, from autonomic functions to consciousness, and from synaptic transmission to neuronal firing patterns. In addition, integration with clinical departments of Erasmus MC and the faculty of Psychology of Erasmus University offers the opportunity for the students to be introduced to all clinical and cognitive disciplines of Neuroscience.

The first year of the Research Master Program in Neuroscience at Erasmus MC starts in August with the Summer School as a 3 week introduction course to Neuroscience. The remainder of the first year consists of a variety of learning activities. The program is centered around 10 modules of 3 weeks each. Each module provides in-depth theoretical and practical training on important issues and essential techniques in Neuroscience. The book “Principles of Neural Science” written by Nobel prize winner Eric Kandel and colleagues provides the theoretical background to this part of the program. Presentation skills are trained during the first year in journal clubs and tutor sessions. Students will also elaborate on a research topic of their choice.

We are approaching a new revolution, one in which we can begin to think about behaviour, perhaps even complex human behaviour, in terms of its underlying biological mechanisms, including the cell biology of the neuron, the specification of connections, the effects of transmitters on signal transduction and gene transcription, and the complex coordination of neuronal circuits. In addition, we are witnessing tremendous advances in the diagnosis and treatment of neurological and psychiatric disorders. (From the Editorial introduction of Neuron, July 2001, by Emilie Marcus)

Key information

Students with a bachelor's degree or equivalent in one of the Life Sciences disciplines including medicine, pharmaceutical sciences, psychology and biology are invited to apply. For medical students who are trained at an academic medical center at which no bachelor's degree can be obtained at present we will consider successful completion of the third year of their medical curriculum as its equivalent. All national and international students who want to enter the Research Master Program in Neuroscience must follow the Neuroscience Summer School at Erasmus MC. Final decision for admission to the first year of the Master of Neuroscience course will be made based on the outcome of the exam of the Summer School in combination with a judgment of the student's motivation revealed by an interview.

Supervised by a tutor they have to complete an extensive literature search, conduct pilot experiments, and learn to formulate relevant and novel research questions. In addition, they have to design an experimental plan how to tackle these questions. This results in a research proposal to be completed at the end of the first year.
During the second year the students conduct the experiments as proposed in their research proposal. After completing the research project students present their results in a Master thesis. The Master thesis is in the format of a paper that is of sufficient quality to be published in an international peer reviewed journal.

Do you want to know more?

The program is organized by the department of Neuroscience which is part of the ONWAR Research School and associate member of the Molecular Genetics Center and Helmholtz Research School.
Program director is: dr. J. van der Steen. Members of the scientific board: prof.dr. C.I. de Zeeuw, prof.dr. J.G.G. Borst, dr. J. van der Steen and dr. J. Holstege.
Program assistant: L. Nijs-de Langen.

For more information please contact us
by e-mail L.Nijs-deLangen@erasmusmc.nl
or visit our website: www.neuro.nl.

Infection & Immunity

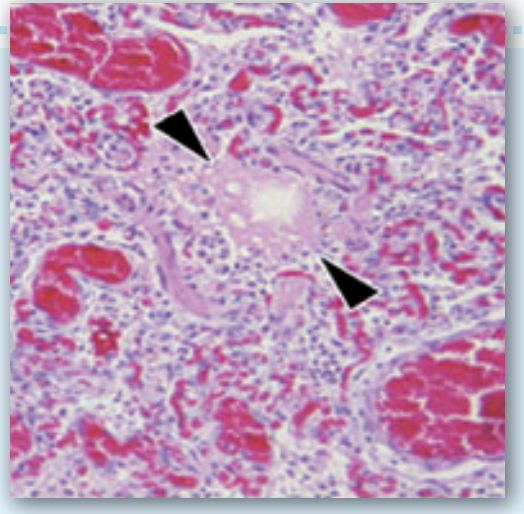
The international **Research Master Program 'Infection & Immunity'** is a two-year programme that aims to train students in translational research at the crossroads of infection and immunity by top-quality research groups at Erasmus MC. With new epidemics unfolding regularly, knowledge of infectious and immune diseases has never been more critical.

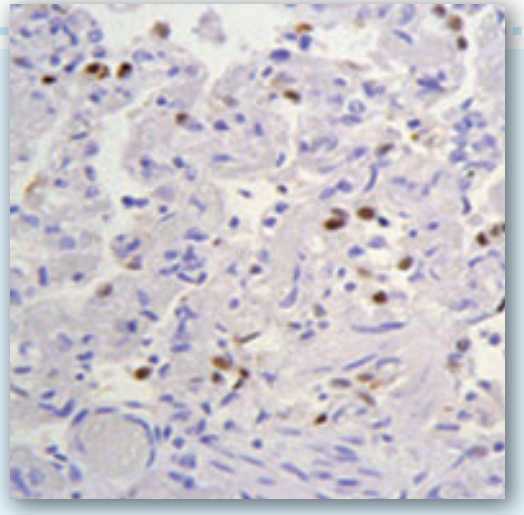
The master programme will combine intensive training in fundamental and advanced immunology and microbiology with extensive training in clinical and population-based research. The student should be able to fulfil all qualifications as described in the Dublin descriptors, as they are applied to this master curriculum. After two years, the Research Master programme 'Infection & Immunity' will result in a master thesis, to be presented at the yearly Research Master 'Infection & Immunity' symposium.

Mission and vision

It is our mission to select and train excellent students at an early stage of their careers to perform top research in the field of Infection & Immune diseases, covering the complete field of host-microbe interplay and autoimmunity, challenge them to become translational investigators, foster them and commit them to the academic world.

Recent developments in (bio)medical technologies provide novel tools to gain in-depth knowledge of the fundamental mechanisms of infectious and immune diseases. Translational research is the hallmark of the Erasmus MC. Its quality relies on strong communication between clinicians and basic scientists. With this research master programme Erasmus MC will invest in a new generation of translational scientists that will strengthen and improve Erasmus MC research.





Program
The main topics of the program are:

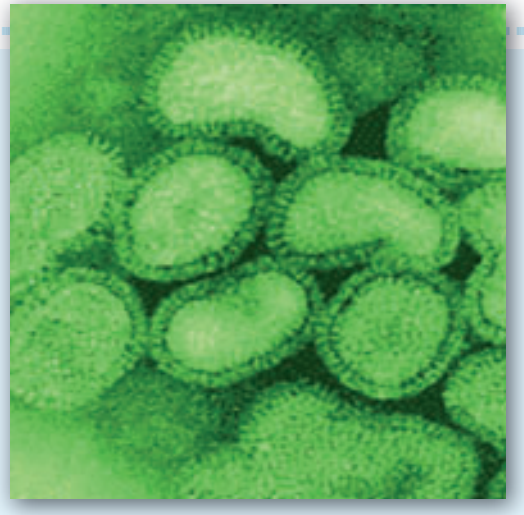
- Immunology: fundamental, organ-specific, transplant immunology, auto-immune diseases, immunodeficiencies.
- Infectious Diseases: basic and advanced microbiology, emerging infectious diseases, host-microbe interplay, role of genetic variation in host and microbe, chronic inflammatory diseases, vaccine development.
- Epidemiology of infectious diseases: epidemics and pandemics.
- Animal models.
- Bio safety.

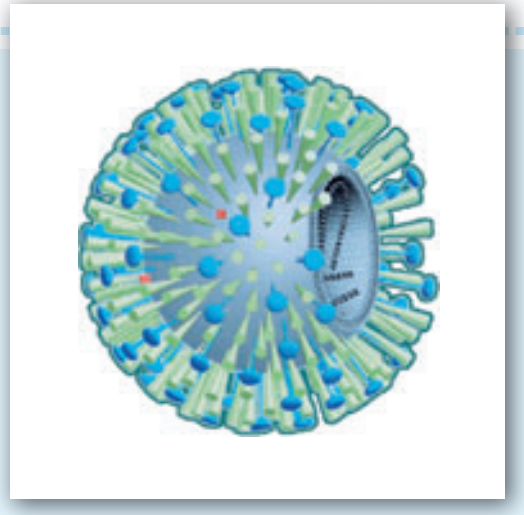
Planning
This new Research Master exists since 2009. In August 2011 the first 9 students graduated and got their MSc title, of whom two from Indonesia and two from Bangladesh.

In 2010 we admitted 17 and in 2011 20 new students, of whom several from abroad. The deadline for the next study year is mid April, each year. The program starts every year with a Summer Course, mid August.

Organisation
The Steering Committee is chaired by Prof.dr. Ab D.M.E. Osterhaus, who is also scientific director of the Postgraduate School MolMed. The Programme Committee is chaired by Dr. Jan Nouwen MD PhD. The office of the Postgraduate School MolMed (Dr. Frank L. van Vliet) organizes this Research Master.

Do you want to know more?
For all information on the school see the website: www.infectionimmunity.nl and www.molmed.nl; e-mail: f.vanvliet@erasmusmc.nl.





Erasmus MC

Erasmus MC is rated among the top research institutes of the Netherlands and participates in various nationally and internationally recognized research schools. There is an extensive collaboration with other national and international health care centers. Erasmus MC, established in the city of Rotterdam, is a university medical center in which new knowledge is generated and passed on to future professionals. It covers a broad field, ranging from illness to health, and from individual to community healthcare. The knowledge generated and new findings will benefit daily care and treatment of patients.

As the largest university medical center in the Netherlands, with over 2,000 students of medicine and 1,500 staff members, Erasmus MC creates special opportunities for research, education and patient care in the Netherlands. Its over 10,000 employees make every effort to this end. Erasmus MC is also the Netherlands' most multi-faceted university medical center. As a part of Erasmus MC, the Institute of Health Policy and Management offers training aimed at policy making and management functions in health care.

Erasmus MC combines a strong health sciences sector, strong basic research, and the largest number of university hospital disciplines in the country. Erasmus MC is also in the process of creating the university-medical-center-of-the-21st century under the motto 'Rotterdam is getting better!'.

Eramus MC

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Text:	Erasmus MC
Photography:	Jeroen Peters, Piet Smaal and Levien Willemse
Design & print:	B&T Ontwerp en advies (www.b-en-t.nl)
Published:	October 2011

www.erasmusmc.nl/masters

11623 B&T Ontwerp en advies (www.b-en-t.nl)