Taiwan International Graduate Program
Molecular Medicine Program

2003/12/5

Introduction

Academia Sinica has established the Taiwan International Graduate Program (TIGP) in collaboration with a consortium of key national research universities in Taiwan. The purpose of this program is to develop a pool of research manpower in the modern multidisciplinary fields that are important for the future economical and social development of Taiwan and to enhance the innovative potential and academic standards of research in these and related fields.

TIGP offers Ph.D. programs in selected disciplines to be agreed upon between Academia Sinica and some of the local key research universities. It is the intent of the TIGP to offer Ph.D. degree programs in inter-disciplinary areas in the physical sciences, applied sciences, engineering, biological and agricultural sciences, health and medical sciences, and humanities and social sciences. All courses will be offered in English.

Academia Sinica assumes principal oversight of the academic options within the Program. It provides the intellectual leadership, the research resources, and the research and physical facilities. Qualified and interested faculty members of the participating national research universities are invited to join as affiliated faculty of the Program, and participate in the teaching of courses, supervision of research activity, and mentoring of the international graduate students.

The TIGP program on “Molecular Medicine”

The complete sequence of the human genome ensures that we will witness breakthroughs in biomedical research at an accelerated pace in the coming decades. For the first time in the history of medicine, the physiological functions and pathology of disease genes are being investigated at both the molecular and genomic levels. Although the lag between the identification of disease-associated genes and the development of therapeutic protocols is rapidly decreasing, the scientific and technical challenges in the post-genome era are rising. An efficient collaboration that integrates basic sciences, clinical research, and biotechnology should address these challenges.

The Molecular Medicine Program (MMP) is offered by the Institute of Biomedical Sciences, Academia Sinica and the School of Life Sciences, National Yang Ming University. The MMP program has over 50 faculty members with specific disciplines in both basic research and technology development. We have not only established vigorous collaboration with the research communities at Academia Sinica, but also developed close ties with clinicians in major medical centers throughout Taiwan through an unique

Clinical Research Center (CRC) program. The MMP program is designed to offer specific training and research opportunities to Ph.D. students who are interested in the frontier areas of biomedical sciences. The objectives of establishing comprehensive teaching and research programs are three-fold:

(1) To promote biomedical research and pursue excellence in science by developing a strong teaching and research program in frontier biomedical sciences;

(2) To broaden and deepen our understanding of mechanisms of human diseases: from genomics to gene function and from physiology to pathology;

(3) To strengthen and promote translational research by bridging basic sciences and clinical investigations and to expedite the development of biomedical technologies.

Research Fields

The MMP program has about 50 faculty members whose research projects encompass basic and clinical-oriented researches related to human diseases that include the following four fields:

(1) **Functional Genomics and Bioinformatics**

- Disease Gene Discovery Using Genomic and Proteomic Approaches
- Functional Genomics
- Bioinformatics

(2) **Molecular and Cellular Basis of Gene Function**

- Gene Regulation and Transcription Factors
- Apoptosis and Cell Cycle Regulation
- Signal Transduction
- Cell Division, Differentiation, and Development
- Immunobiology
- Infertility

(3) **Disease Mechanisms**

- Molecular Epidemiology and Toxicology
- Cardiovascular and Blood Diseases
- Neurological Diseases
- Virus-Host interaction and Infectious Diseases
- Cancer and Neoplastic Transformation

(4) **Medical Biotechnology**

- Biochips and Microarrays
- Disease Gene Diagnosis and DNA Vaccine Development
- Stem Cell Biology
- Cell and Gene Therapy
- Drug Design and Development

Faculty and Staff

■ Academia Sinica

Dr. Lan-Yang Ch'ang
Ph.D. Vanderbilt University
Genomic/Bioinformatics

Dr. Lee-Young Chau
Ph.D. University of Kentucky
Cardiovascular Biology/Gene Therapy

Dr. Chih-Cheng Chen
Ph.D. University College London
Pain/Neurobiology/Mouse Genetics

Dr. Joanne Jeou-Yuan Chen
Ph.D. University of Minnesota
Cancer Genomics/Tumor Biology

Dr. Steve S.-L. Chen
Ph.D. Purdue University
Retrovirology/Virus-Host Interactions/Viral Pathogenesis

Dr. Yuan-Tsong Chen
Ph.D. Columbia University
Genomic Medicine/Human Genetics

Dr. Yijuang Chern
Ph.D. University of Massachusetts
Signal Transduction/Gene Regulation

Dr. Mei-Shang Ho
M.D. Indiana University
Epidemiology/Virology

Dr. Sho Tone Lee
Ph.D. University of Manitoba, Canada
Drug Resistance/Vaccine Developmemt

Dr. Wen-chang Lin
Ph.D. Case Western Reserve University
Bioinformatics/Tumor Biology/Cancer Metastasis

Dr. Wen-Harn Pan
Ph.D. Cornell University
Cardiovascular Diseases/Nutrition/Genetic Epidemiology

Dr. Steve Roffler
Ph.D. University of California, Berkeley
Monoclonal Antibodies/Prodrugs/Surface Expression

Dr. Ru-Chi Shieh
Ph.D. University of Rochester
Electrophysiology/Biophysics

Dr. Sheau-Yann Shieh
Ph.D. Baylor College of Medicine
Cancer Research /Molecular Biology/Biochemistry

Dr. Hsiu-Ming Shih
Ph.D. University of Minnesota
Signaling Transduction/Protein Kinases/Phosphatases

Dr. Song-Kun Shyue
Ph.D. University of Texas-Houston
Viral Vector/Gene Transfer/Vascular Protection

Dr. Tang K. Tang
Ph.D. Yale University
Molecular Genetics/Cell Mitosis & Germ Cell Development

Dr. Mi-Hua Tao
Ph.D. Columbia University
Cancer Vaccines/Immunotherapy/Gene Therapy

Dr. Woan-Yuh Tarn
Ph.D. National Tsing Hua University

RNA Processing /Nucleocytoplasmic Transport

Dr. Danny Ling Wang
Ph.D. University of Nevada
Vascular Biology/Gene Regulation

Dr. Yu-Ting Yan
Ph.D. University of Medicine and Dentistry of New Jersey
Molecular Genetics/Developmental Biology

Dr. Ruey-Bing (Ray) Yang
Ph.D. University of Texas, Southwestern Medical Center
Receptor Biology/Signal Transduction/Vascular Biology

Dr. Jeffrey J.Y. Yen
Ph.D. Baylor College of Medicine
Molecular & Cell Biology/Hematopoiesis/Apoptosis

Dr. Pauline H. Yen
Ph.D. University of California, Berkeley
Mammalian Sex Chromosomes/Male infertility

■ **National Yang Ming University**

Dr. Kuo-Wei Chang
Ph.D. Northwestern University
Molecular Pathology

Dr. Tai-Jay Chang
Ph.D. Mt. Sinai school of Medical
Cancer Genomics

Dr. Cheng-Chen Chen
Ph.D. London School of Hygiene and Tropical Medicine
Molecular Entomology/Insect Immunity

Dr. Chi-Ju Chen
Ph.D. Michigan State University
Molecular Virology/Host-Virus Interaction

Dr. Fu-Du Chen
Ph.D. University of Manchester, U.K.
Gene Expression Imaging

Dr Jyh-Cheng Chen
Ph.D. University of Arizona
Molecular Imaging

Dr. Mei-Yu Chen
Ph.D. The Johns Hopkins University
M.D. National Yang Ming Medical College
Molecular Genetics/Biochemistry

Dr. Yi-Ming Arthur Chen
DSc. Harvard University School of Public Health
M.D. National Yang Ming University
Cancer Biology/Tumor Virology/Molecular Epidemiology

Dr. Henrich Cheng
Ph.D. Karolinska Institute, Sweden
Neurosurgery/Neurochemistry/Cell Biology

Dr. Tzu-Hao Cheng
Ph.D. Rutgers, the State University of New Jersey
Molecular Genetics/Gene Regulation

Dr. Chin-Wen Chi
Ph.D. State University of New York at Buffalo
Disease Mechanisms

Dr. An-Na Chiang
Ph.D. National Taiwan University
Cardiovascular Biology/Nutritional Biochemistry/Lipidology

Dr. Eileen Jea Chien
Ph.D.Albert Einstein College of Medicine
Signal Transduction/Immunobiology

Dr. Teh-Ying Chou
Ph.D. The Johns Hopkins University
M.D. National Yang-Ming University
Thoracic Pathology/Tumor Biology

Dr. Ming -Ji Fann
Ph.D. California Institute of Technology
Molecular and Cellular Study on Neural Genes

Dr. Shie-Liang Hsieh
Ph.D. University of Oxford
Molecular Immunology/Immunotherapy

Dr. Ming Ta Hsu
Ph.D. California Institute of Technology
Genomics/Biochemistry/Molecular Biology

Dr. Shan-Ling Hung
Ph.D. University of Pennsylvania
Virology/Molecular Biology

Dr. Jeng-Jong Hwang
Ph.D. Colorado State University
Medical Biotechnology

Dr. Lung-Sen Kao
Ph.D. University of Massachusetts, Amherst
Neurosciences

Dr. Te-Chang Lee
Ph.D. National Taiwan University
Cell Biology/Genetic Toxicology

Dr.Yan-Hwa Wu Lee
Ph.D. University of Tennessee
Biochemistry/Molecular Virology

Dr. Shu-Chun Lin
Ph.D. University of Illinois at Chicago
Tumor Biology/Gene Regulation

Dr. Wan-Jr Syu
Ph.D. University of Wisconsin-Madison
Disease Mechanisms

Dr. Shin-Feng Tsai
Ph.D. Mt. Sinai School of Medicine
Human Genetics/Genomics

Dr. Huey-Jen Tsay
Ph.D. State University of New York at Stony Brook
Neurodegenerative/Zebrafish Development

Dr. Fung-Fang Wang
Ph.D. Indiana University
Cell Growth and Differentiation Control

Dr. Yau-Huei Wei

Ph.D. State University of New York at Albany
Bioenergetics/Molecular Basis of Diseases

Curriculum and Degree

Introduction

The education and training of graduate students will be an important component of this program and will include in-depth laboratory training, scientific courses, seminars and forums involving outstanding invited speakers (e.g. Nobel laureates; members of the National Academy of Sciences, USA, ROC, etc.) from abroad. During the first year of study, MMP students are required take two multidisciplinary core courses, which cover the entire spectrum of biomedical sciences from the principles of macromolecular structure to the functions of biological systems at the whole organ level. With this broad perspective, students are prepared for advanced course work in specific areas of interest. The various research groups spanning nearly every major field in the biomedical sciences offer a variety of advanced courses. By selecting different combinations of advanced courses, graduate students have the flexibility to formulate an interdisciplinary education tailored to their individual interests and career objectives. Laboratory rotations during the first year provide practical laboratory training and an opportunity to experience cutting-edge research in different fields of biomedical sciences. Students should complete their formal coursework with a qualifying exam before advancing to his/her Ph.D. candidacy.

Required courses: required for all students

1. Molecular and Cell Biology (3 credit units)
2. Molecular Medicine (3 credit units)
3. Seminars (1 credit unit per semester, total 4 credit units for the first 2 years)
4. Laboratory rotations (1 credit).

Elected courses:

1. Advances in Genomics (2 credit units)
2. Advances in Bioinformatics (3 credit units)
   This course will focus on new developments in bioinformatics and their applications in genomics Topics include biological database establishment and application; sequence similarity search and comparison; functional assignment; SNP and human variations.
3. Experimental Approaches in Molecular and Cell Biology (3 credit units)
4. Genomic Medicine (2 credit units)
5. Signal Transduction and Apoptosis (3 credit units)
6. Molecular and Cellular Aspects of Immune Regulation (3 credit units)
   This course provides a thorough review of advanced immunology (2 credit units)
7. Virus and Host Interactions (2 credit units)
   Molecular and cellular biology of viruses, host cells and interactions between

viruses and the host.

8. Molecular and Cellular Neurobiology (3 credit units)
9. Frontiers in Cardiovascular Medicine (2 credit units)
   This course will introduce recent progress in specific areas including cardiac hypertrophy, ion channels, atherosclerosis, strokes, and gene therapy. The perspectives and future challenges in each of these areas will also be discussed.
10. Cancer Biology (3 credit units)
    This course is designed to provide a fundamental understanding of human cancer. Relevant scientific concepts will be reviewed. The causes of cancer and the practical aspects of cancer prevention and treatment will be covered. The mechanisms of cancer initiation at the cellular and molecular levels and cancer prevention and treatment will be emphasized.
11. Cell and Gene Therapy (2 credit units)
    This course covers a rapidly evolving area of biomedical sciences and includes lectures on basic principles of gene transfer technologies at the somatic cell, fetal stage and germ-line levels, on various therapy-relevant patho-physiological aspects of diseases such as cancers, cardiovascular disorders, monogenic and complex hereditary diseases, animal model studies, preclinical investigations and clinical trials. Ethics, legal and social issues will also be discussed.

The students may elect other courses offered by other graduate programs within TIGP.

Teaching Assistant (TA) and the Chinese Language Course

All students of the MMP program are required to serve as TA for one semester. In order to help the international students in their daily lives' communication with the local people, TIGP offers a required one-year course in Mandarin Chinese.

Requirements for the Ph.D. Degree

1. Satisfactory completion of an oral qualifying exam administered by a committee of the faculty. This examination should be taken no later than the beginning of the third-year of enrollment. The student should turn in two non-thesis topics with one-page abstracts. One topic will be selected for examination. A formal proposal should be submitted by the student for examination by a faculty committee appointed by the program office. In case of failure, the student should retake the exam once. Every student must advance to Ph.D. candidacy by the end of the third year of graduate study.

2. Satisfactory completion of at least 18 credits in formal courses including both required courses and elective courses, as well as 6 credits of Ph.D. thesis.

3. Satisfactory completion of rotation in two laboratories (3 months/lab) in the first year. The lab rotations should be completed before the beginning of the second-year

enrollment. After lab rotations, students may choose his/her thesis advisor and start full-time research.

4. Completion of a satisfactory investigation and oral defense of the thesis presentation, approved by a faculty committee.

5. Written acceptance of the thesis by each member of the final oral examination committee.

6. Not more than seven years may elapse between the date of matriculation and the fulfillment of all requirements for the degree.

7. Students should provide an annual progress report to the thesis committee. The first annual report should be given during the period of the third-year enrollment.

Admission to the Ph.D. Program

We encourage students from around the world to apply. The application deadline for admission in fall 2004 is March 31, 2004. Applicants (either international students or students from within Taiwan) with a B.S. or M.Sc. degree (or equivalent) from an accredited institution will be considered for admission. The following criteria will be used to evaluate the applicant's qualification for admission.

1. Two official copies of undergraduate and graduate (if applicable) academic records or transcripts. A grade point average (GPA) of 3.0 or higher on a 4.0 scale for all undergraduate or graduate study is preferred.

2. TOEFL (or equivalent): all applicants whose first language is not English must submit the TOEFL (or equivalent) score, except those applicants who can provide evidence to show that they have recently completed two or more years of study in an English-speaking country. Applicants in Taiwan may take the General English Proficiency Test (GEPT) administered by the Language Training and Testing Center. Applicants are required to submit their TOEFL score (> 550 on paper-based or 213 on computer-based test) or the High-intermediate level certificate (GEPT) when applying for admissions.

3. Graduate Record Examination (GRE) scores: All applicants are required to take the GRE's General Test. An advanced Subject Test in biochemistry, cell and molecular biology, chemistry, or biology is strongly recommended. A high GRE scores will significantly benefit the evaluation of the application.

4. Three letters of recommendation commenting on the applicant's personal character, and qualifications for independent study, including intellectual ability, research potential, and scientific motivation.

5. Statement of purpose and plan for graduate study (in English)

6. Other evidence of scholarly achievements

Candidates may be invited to Taipei for interviews (local applicants) or interviewed by telephone (international applicants). Please send the above documents to:

Admissions Office
Taiwan International Graduate Program
Academia Sinica
128 Academia Rd., Section 2
Nankang, Taipei 115
Taiwan

The application form package can be obtained from the Admissions Office (TIGP) or directly downloaded from the website (http://www.sinica.edu.tw/~tigp).

Degree Conferral Policy

For administrative reasons, the students in the Molecular Medicine Program shall register at our partner institution (Inst. of Biochemistry, National Yang Ming University). Upon completion of our program, students will receive a Ph.D. diploma from our partner institution and a certificate jointly signed by the President of Academia Sinica and the President of National Yang Ming University.

Fellowship and Stipends

The TIGP will provide full fellowship support for all enrolled graduate students for 3 years. The stipend levels are about US$ 850 (NT$30,000) per month. In subsequent years, the financial support for all qualified students will be in general in Ph.D. student assistantships provided by the thesis advisor's research grant from the National Science Council, the National Health Research Institute, or Academia Sinica.

Medical Insurance

Four months after receiving their student I.D., students are qualified for Taiwan's National Health Insurance Program. Students pay the same premium (about US$ 210/year) as all Taiwan citizens and are entitled to the same medical coverage.

Cost of Study

The tuition fee is about US$ 1,500 per year.

Living and Housing Costs

Academia Sinica is currently constructing a dormitory building for TIGP graduate students near the Academia Sinica campus. Until this structure is completed, a block of private rooms with bath are set aside in the Guest House of the Activity Center of Academia Sinica. This type of housing will be available to the TIGP graduate students at low cost. Off-campus private housing is generally more expensive. Rents for off-campus apartments range from NT$ 5,000-15,000 per month. In addition, Yang Ming University also provides limited rental housing at Yang Ming campus. Meals are also available at modest costs at the Activity Center Cafeteria/Dining Hall, the Chinese restaurant, and the Western restaurant on the Academia Sinica campus.

Correspondence and information

For general information regarding TIGP, please contact

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National Yang Ming University
http://www.ym.edu.tw

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