

Research Projects in the Anatomy Department

The Genetics of Mental Retardation in Malta.

This is a joint project being performed in collaboration with the Istituto di Genetica, Università `del Sacro Cuore, Roma.

Funding: *Grants from the Sixth Italian Protocol and the Sovereign Order of Malta (SMOM).*

Investigators: *Professor Alfred Cuschieri (Department of Anatomy, University of Malta); Professor Giovanni Neri, (Università ` Cattolica del Sacro Cuore, Rome); Dr. Edith Said, Mr. Sherif Suleiman, Mr. J. Ellul, (Department of Anatomy, University of Malta)*

The aim of this project is to review past and current cases of Mental retardation in the light of recent advances in genetics. Individuals resident at "Dar Tal-Providenza", a home for mentally retarded individuals, were reviewed clinically, screened for the Fragile X syndrome and had cytogenetic analysis, telomere analysis and Fluorescence In Situ Hybridization (FISH) for single gene disorders. The same techniques are being used on mentally retarded individuals residing with their families and seen at the clinical cytogenetics clinic at St. Luke's Hospital. This study has brought to light a number of genetic anomalies and dysmorphology syndromes that were previously undiagnosed.

Screening of Maltese Medicinal & Aromatic Plants for Pharmacological Activity

This is a joint project with the Institute of Agriculture in the University of Malta.

Funding: *Grant from the National RTDI Programme*

Principal Investigators:

Dr. Everardo Attard, Institute of Agriculture, University of Malta

Professor Alfred Cuschieri, Department of Anatomy, University of Malta

Several Maltese medicinal and aromatic plants are reputed to be medically useful to cure various ailments. This study investigates the true pharmacological activity of extracts of these medicinal plants as regards their cytotoxic, proliferative and other effects on human normal and cancer cells in culture. Alongside this, we shall catalogue the presence or absence of these medicinal plants and their relative abundance in the wild, to shed light on which plants are endangered. This study will investigate which plants might have potential commercial value.

Dysmorphology of Spontaneously Miscarried Foetuses

Principal Investigators: *Professor Alfred Cuschieri, Department of Anatomy, University of Malta;*
Dr. Jean Calleja Agius, Department of Anatomy, University of Malta

Funding: University of Malta

Foetuses resulting from spontaneous miscarriages are examined post-mortem to study the embryology and prevalence of malformations, dysmorphology and chromosome anomalies. In a big proportion of cases where the foetus has been dead in utero for several days and cells are non-viable, the most common numerical anomalies are still detectable by interphase FISH analysis. This project is an extension of the "Register of Congenital Anomalies in Malta", which was originally established within the Department of Anatomy in 1984. It is intended to identify the anomalies that are the main causes of foetal death, but are not normally included in the Register of congenital anomalies, which includes the anomalies recorded clinically in live or still-born babies. It will therefore give a more complete picture of Foetal and Congenital Anomalies, and of their pathogenesis.

Cancer Research

In vitro testing on human cancer cell lines of extracts from local conifers and flowering plants (lamiaceae and asteraceae).

The Department of Anatomy in conjunction with the Department of Clinical Pharmacology and the Curator of the University Botanical Gardens, at the University of Malta is carrying out in vitro testing on human cancer cell lines of various extracts from local conifers and flowering plants, members of the lamiaceae and asteraceae. The main work has concentrated on the induction of apoptosis on specific cancer cell lines and comparison of activity with normal cells. These natural extracts, as well as local honeybee propolis, are also being tested for differentiation-inducing activity especially on leukaemia cell lines. There is ongoing collaboration with the Department of Bioorganic Pharmacy of Pisa to analyze the oil extracts being used. Collaboration is also ongoing with the Cancer Research Laboratory at Nottingham University to further understand the mechanism of apoptosis induced by such extracts.

Other Cancer Research

Researchers: *Dr Pierre Schembri Wismayer is co-supervising or supervising a number of undergraduate medical students and post-graduate pharmacy students including in particular Elizabeth Zammit and Stephanie Darmanin (these in collaboration with Prof Camilleri Podesta and Mr Joseph Buhagiar from the Faculty of Science) as well as other collaborations with clinicians from St Luke's hospital.*

Funding: Internal – UoM

Summary: This work includes a number of diverse projects such as research on the cytotoxic properties of Maltese plants, development of a local test for a particular hereditary cancer, identification of risk factors in Maltese breast cancer and assessing cancer-dissemination risk of certain clinical procedures.

Stem-Cell Trans-differentiation and Expansion

Researchers: *Dr Pierre Schembri Wismayer and undergraduate students Yanika DeBattista, Charlene Grech and Annalise Cassar*

Funding: Internal – UoM

Summary: Cord blood is collected with maternal consent (and ethical approval). Cord blood cells will be cultured with different stromal cells isolated from different sources. These diverse stroma will be studied for their ability to expand hematopoietic progenitor cells *ex vivo*, as will chromatin - modifying agents, such as demethylating agents and histone deacetylase inhibitors and different biological/semi-synthetic matrices. All the above agents will also be tested for their effects on stem cell trans-differentiation. Stem cells and matrices will also be combined to produce biological tissue substitutes, such as skin.

Gene Regulation in Differentiation and Disease

Researchers: *Dr Pierre Schembri Wismayer and post-graduate student Byron Baron*

Funding: Internal – UoM

Summary: Differences in gene expression underpin all functions of the body in health as well as in disease. An important part of the puzzle is to understand the regulation of gene expression resulting in these patterns and the subsequent phenotypes. In cancer, differences in gene regulation and gene expression are responsible for the behaviours of cancer - longevity (stem cell effect) and metastasis - which often kill patients. Learning how to control these genes will lead to effective treatments. Most of our work involves regulation of transcription factor activity during leukaemia differentiation which may also play a role in some congenital diseases like Down's Syndrome.

MorphBank: An Open Web Depository for Biologic Material

Many biological disciplines such as comparative morphology, anatomy, and histology draw important conclusions from images. However, many of these images cannot be published in journals due to page constraints, and thus they are not widely available. MorphBank is for these images what GenBank is for genetic data - an easily accessed storehouse with added functionality tailored to the disciplines using the resource.

Dr. Isabel Stabile has been appointed Lead Scientist responsible for expanding MorphBank into the field of human sciences. Her role is to coordinate the collection of human anatomy images in all formats into an open web depository to form the basis for international collaborative studies. A number of research and teaching initiatives based on these data are ongoing.

For link to the web site see: <http://morphbank.scs.fsu.edu/About/Introduction/#>

Office of Medical Education and Research (OMER)

OMER brings together expertise on medical education from different academic disciplines, from policy makers and from practitioners. It promotes partnerships between researchers and others, whilst retaining the independence to engage in analysis and constructive critique of policies and practice in medical education.

The overall goal of this long term research programme is to improve the educational process by encouraging scholarly inquiry related to medical education and by promoting the dissemination and practical application of research results. A number of different studies are proposed over the next several years.

Student support and mentoring: The learning experience of international students

Strategies used by medical students to combat anxiety/stress

Teaching and learning:

An evaluation of peer to peer teaching and learning

Student behaviour and learning in small group settings

Using year 2 students as patient simulators for Year 1 teaching/learning

The impact of teaching Living Anatomy (surface anatomy and imaging skills) on preparedness of Year 3 students for clinical learning

Long term effectiveness of anatomy teaching: Do clinical students remember any anatomy?

Student use of station-time allotments in 2 hour anatomy dissection sessions

Curriculum development

Medical education and curriculum development: A case study

Assessment

Does cadaver dissection (student projects) improve performance on summative examination (practical/written)

Post-graduate education

When do Maltese students/doctors decide about specialty career?

Gender differences in choice of specialty

Student/Doctor mobility

Exploratory Analysis of Medical Data Using GUHA Method

The goal is to set up international collaborative research projects together with Prof. Rauch of the Faculty of Informatics at the University of Economics, Prague. The purpose of this collaboration is to examine the correlations between sonographic images of the normal and abnormal human pelvis and clinical parameters with knowledge-based diagnostic systems using fuzzy relational computations, LISP Miner and GUHA. For link to the web site see: <http://lispminer.vse.cz/>

Human Sciences Research Network

Faced with the twin dilemmas of a static or declining financial base and a changing student population, institutions of higher education have to do more with less while still maintaining quality which leads to the growth and learning of all involved. Many institutions have responded to the challenge by adopting an interdisciplinary approach to teaching and research.

Dr. Stabile conceptualised this network and serves as coordinator to:

Develop a database of on-going and completed research studies on Human Sciences from all relevant faculties

Organise Human Sciences Research Seminars showcasing on-going and completed research conducted by students and staff at the University of Malta

Foster inter-disciplinary work in Human Sciences

Pedagogic Research

Researchers: Dr Pierre Schembri Wismayer together with Prof Camilleri Podesta and Prof Cuschieri and collaborating with other colleagues in the Physiology Dept (UoM) and in the Anatomy Dept (University of Cambridge).

Funding: Internal

Summary: In this project, we analyse the feedback of students over a number of years and compare issues arising between different types of students, different universities and different departments.