

UNIVERSITY OF PAPUA NEW GUINEA
SCHOOL OF MEDICINE AND HEALTH SCIENCES
INFORMATION HANDBOOK

DIVISION OF BASIC MEDICAL SCIENCES

The Division of Basic Medical Sciences (BMS) is located in the Medical Sciences Building in the School of Medicine and Health Sciences.

Structure and Current staff strength:

Head of BMS: Assoc. Prof. Victor J. Temple. M. Sc., Ph. D., C. Biol., M. S. B (M. I. Biol.)

- Professor Teatulohi Matainaho. B. Sc (Hon), PhD.
 - Professor and academic head of BMS
- Associate Professor Victor J. Temple. M. Sc., PhD, C. Biol., M. S. B.
 - Administrative head of BMS.

BMS is made up of Four Disciplines:

- **Discipline of Anatomy:**
 - Dr. David Inaho. B. Med. Sci., MBBS, DGO, M. Sp. Med.
 - Head of discipline of Anatomy
 - Dr. Heni Taunao-Lega. B. Med. Sci., MBBS, Cert Av Med.
 - Lecturer
 - Mr. Joe Kagl: Medical Technologist
 - Mr. Viru Lama: Technical Officer
- **Discipline of Biochemistry & Molecular Biology:**
 - Assoc. Prof. Victor. J. Temple. M. Sc., PhD, C. Biol., M. S. B.
 - Head of discipline of Biochemistry and Molecular Biology
 - Assoc. Prof. Andrew Masta. B. Sc. (Hons), P. G. D, PhD.
 - Associate Professor
 - Dr. Paul Pumuye. B. Med. Sci., MBBS.
 - Lecturer (on study leave)
 - Mr. Nigani Willie. B. Sc. (Hons)
 - Tutor Temporary full time
 - Mr. Michael Mohe Panui (B. Sc.): Scientific Officer
 - Mr. Reuben Mari (B. MLS, DMT, Cert MLT): Medical Technologist
 - Mrs. Jennie Bautau-Grant: Technical Officer
- **Discipline of Pharmacology:**
 - Professor Teatulohi Matainaho. B. Sc (Hon), PhD.
 - Head of discipline of Pharmacology
 - Dr. Naomi T. Hehonah. B. Sc. (Hons), P. G. D, PhD.
 - Senior Lecturer
- **Discipline of Physiology:**
 - Dr. Wangi P. Linjim. MBBS, M. Sc.
 - Head of discipline of Physiology
 - Dr. Shalon Taufu. MBBS
 - Lecturer
- **Chief Technical Officer in BMS:**
 - Mr. Samson Grant. B. App. Sci. (Medical Sciences), Assoc. Deg. App. Sci (Clinical Laboratory Techniques)
- **Secretarial Staff in BMS:** Ms. Theresa Dunamb.

Teaching and Research activities:

All academic staff in BMS teaches across the spectrum of all programs offered in the SMHS, the three-term academic session in the MBBS program, the two-semester academic session in the Health

Sciences, Dentistry and Nursing programs, and the Postgraduate programs, including the M. Med Part 1 Common Core. The anatomy computer laboratory is fully functional and can be used by students from 8.00am to 8.00pm from Monday to Friday. By special request students are able to use the computers beyond the closing hours on weekdays and during the weekends. The anatomy computer laboratory is under the supervision of the Chief Technical Officer (CTO) in BMS.

Academic staff in the BMS actively participates in the supervision of research projects of Bachelor of Medical Sciences students, major projects of final year students in the Division of Health Sciences SMHS and the Biology Strand in the School of Natural and Physical Sciences UPNG.

Achievements in academic research:

The academics in BMS are actively involved in intensive state of the art research, both nationally and internationally. All the international research collaborators are from world-renowned research institutions and universities in Australia, USA, Canada, Europe and Asia.

The current research centres and research groups in BMS are as follows:

Several undergraduate and postgraduate students have successfully completed their research projects in the **Molecular Biodiscovery and Biomedicines Research Laboratory (MBBRL)** under the supervision of Prof. Teatulohi Matainaho. The research interests of the Biodiscovery and Biomedicine research laboratory include the following

- ❑ The Pharmacology of Plants and Marine Organisms of Papua New Guinea for Development as Therapeutic Compounds for Treatment of HIV/ AIDS, TB, Malaria, Cancer and Diabetes
- ❑ Biochemical and Pharmacological Properties of Snake Venom of PNG
- ❑ Phylogenetics studies of PNG Snakes
- ❑ Development of Traditional Medicine and Policy in PNG.
- ❑ Phytochemical Studies of Traditional Food Plants of PNG
- ❑ Development of Access Benefit Sharing and Intellectual Property Right Systems in Biodiversity

International collaboration has become a key feature of the MBBRL research work in drug discovery. Collaboration with the US National Cancer Institute (NCI) during the years prior to 2006 paved the way for the development of the current network of collaborating institutions. Apart from the University of Utah, the MBBRL has established strong collaboration with Professor Raymond Andersen of the University of British Columbia, Canada, in the area of marine natural products discovery. This relationship has resulted in significant work and technology transfer towards research infrastructures and training in UPNG. Training and technology transfer has also been supported through MBBRL research partnership with Professor Phil Crews (University of California, Santa Cruz), Professor Bill Gerwick (University of California, San Diego), and Professor David Sherman (University of Michigan). Joint research projects with United States and Canadian based scientists have resulted in numerous marine and terrestrial expeditions for biological samples to identify new chemical entities and molecules for potential therapeutic application. At least three PNG scientists have spent 6 to 12 months as part of their research training at the University of Utah. They have completed their Masters of Medical Sciences programs at UPNG. The research on snakebite and venom has been established over several years with Mr. David Williams, formerly of James Cook University, and now with the Australian Venom Research Unit, University of Melbourne. This relationship has become very important in the development of our national capabilities in the understanding of envenomation and treatment.

Recently in 2008, MBBRL was able to establish joint research program with Professor Brett Neilan of the University of New South Wales, Australia. The focus of the research is to investigate the genetic diversity and potential for bioactive compound biosynthesis from marine organisms of Papua New Guinea. Hence, we aim to develop methods and identify molecules that will have potential value to the pharmaceutical and / or biotechnology industries. In 2008, a joint research program was also established with the Southern Cross University, Australia, with the aim to develop chemical and pharmacological protocols for the standardization of traditional herbal products.

All MBBRL research collaborations have been sustained through institutional Memorandum of Understandings. List of collaborating institutions:

PNG National Forest Research Institute; University of Utah, USA; University of British Columbia, Canada; University of California, Santa Cruz, USA; University of California, San Diego, USA; University of Michigan, USA; University of New South Wales, Australia; University of Southern Cross, Australia; Australian Venom Research Unit, University of Melbourne, Australia; School of Biological Sciences, University of Bangor, Bangor, Wales, United Kingdom; Port Moresby General Hospital; Cancer & Radiation Biology Research Unit, Queensland Institute of Medical Research, Brisbane, Australia; Venomics Group, Cancer & Radiation Biology Unit, QIMR, Australia; Royal Princess Alexandra Hospital & University of Queensland & QIMR; Museum of Natural Science & Department of Biological Sciences, Louisiana State University, USA

Several undergraduate students have successfully completed their research projects in the **Micronutrient Research Laboratory (MNRL)** under the supervision of Assoc. Prof. Victor J. Temple. Research interests of the MNRL include the following:

- ❑ Maternal and Child Malnutrition with Emphasis on Micronutrient Deficiencies (Iodine, Iron, Zinc and Vitamin A) in Infants and Mothers;
- ❑ Metabolic Disorders (Diabetes Mellitus, Gestational Diabetes, Thyroid Dysfunction, Anemia, Oxidative Stress, and Hypertension) with Special Interest in Diagnosis and Clinical Biochemical Assessment at the Subclinical Stages;
- ❑ Disease Trends in PNG, with Emphasis on Retrospective Assessment of Laboratory Data Obtained in Clinical Biochemical Department in Port Moresby General Hospital.
- ❑ Food Security and its Implication for Maternal and Child Health.
- ❑ Improving the Nutritional Status of People Living with HIV/AIDS.

The MNRL in the BMS SMHS was set up 2003. The MNRL was mainly involved with analysis of the trace element Iodine in cooking salt, table salt and urine. In 2004 the MNRL received international recognition after successfully participated in the two international quality control (QC) programs for assay of the trace element iodine. In the same year the MNRL was registered as member of the:

- ❑ International Resource Laboratories for Iodine (IRLI) Network,
- ❑ Iodine Reference Laboratory for Asia Pacific Region (IRLAPR) in the Institute of Clinical Pathology and Medical Research (ICPMR), Westmead Hospital Sydney Australia,
- ❑ National China Reference Laboratory (NCRL),
- ❑ International Iodine Network Program and
- ❑ INCAP laboratory in Guatemala, South America.

The MNRL regularly participates in the External QC programs of:

- ❑ National China Reference Laboratory (NCRL) and INCAP for the analysis of iodine in salt;
- ❑ Ensuring the Quality of Urinary Iodine Procedures (EQUIP)
- ❑ External Quality Assurance (QAP) Programs of the Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA,
- ❑ ICPMR Westmead Hospital Sydney, Australia
- ❑ NCRL Urinary Iodine Quality Assurance Programs.

The certificate of participation and grading of the performance of the MNRL in the EQUIP program in the CDC Atlanta Georgia USA is attached. Appropriate funding is required to ensure that the standard already achieved by the MNRL-SMHS is sustained.

List of collaborating institutions:

University of Brussels, Belgium; Institute of Clinical Pathology & Medical Research (ICPMR), Westmead Hospital, Westmead, Sydney, NSW; International Micronutrient Malnutrition Prevention and Control (IMMPaCt) Programme, US Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA; National Center for Environmental Health, Division of Laboratory Sciences Ensuring the Quality of Urinary Iodine Procedures (EQUIP); Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA

Several undergraduate students have successfully completed their research projects in the **Molecular Biology Research Laboratory (MBRL)** under the supervision of Assoc. Prof. Andrew Masta. Research interests include the following:

- ❑ Molecular epidemiology of Hepatitis B & C,
- ❑ Molecular Mechanism of Anti-cancer Drug Action,
- ❑ Cancer Chemotherapy and Drug DNA Interactions,

- ❑ Effects of Drugs on Gene Expression,
- ❑ DNA Repair and Apoptosis, Gene Therapy,
- ❑ Human DNA Repair Systems,
- ❑ Cancer Genetics, Human Genetics, Parasite Genetics, Microbial Genetics and Bioactive Compounds.

Several undergraduate students have also successfully completed their research projects in the **Therapeutic Drug Quality Assessment Research Group (TDQARG)** under the supervision of Dr. Naomi Hehonah. These projects are using the High Performance Liquid Chromatography (HPLC) to quantitatively assess the quality of Antimalarials (Artesunate and Artemether) and Antibiotics drugs.

Other areas of research include the following:

- ❑ Drug metabolism, addressing mechanistic basis of Xenobiotics,
- ❑ Gene Sequencing and Genotyping of *Plasmodium falciparum* using PCR Polymerase Chain Reaction (PCR),
- ❑ Immuno-Histochemistry,
- ❑ Malaria Cell Culture,
- ❑ Determination of IC₅₀S of Drugs and Toxicants

Some of the results obtained in research projects completed by the various research centres and groups in BMS have been published in both national and international journals. A few of these publications are listed below.

- ❑ Wegerski, C.J., Hammond, J., Tenney, K., Matainaho, T., Crews, P. A serendipitous discovery of isomutoporin-containing sponge populations of *Theonella swinhoei*, *Journal of Natural Products* (2008) 70 (1): 89 – 94
- ❑ Clark, B. R., Engene, N., Teasdale, M. E., Rowley, D. C., Matainaho, T., Valeriote, F. A., Gerwick, W. H. Natural products chemistry and taxonomy of a *Blennothrix* species of marine cyanobacterium. *Journal of Natural Products* (2008) 71: 1623 – 1624.
- ❑ Dindi, M., Bugni, T., Ireland, C., Harper, M.K., Matainaho, T. Isolation of bioactive compounds from Papua New Guinea plant, *Euphorbia* CF. *hirta*. *Journal of Institute of Chemist, PNG* (2008) 1: - 77
- ❑ Gutierrez, M., Suyama, T. L., Engene, N., Wingerd, J. S., Matainaho, T., Gerwick, W. H. Apratoxin D, a protein cytotoxic cyclodepsipeptide from Papua New Guinea collections of the marine cyanobacteria *Lyngbya majuscula* and *Lyngbya sordid*. *Journal of Natural Products* (2008) 71: 1099 – 103.
- ❑ Linnington, G., Edwards, D. J., Shuman, C. F., McPhail, K. L., Matainaho, T., Gerwick, W. H. Symplocamide A, a potent cytotoxic and chymotrypsin inhibitor, from the marine cyanobacterium *Symploca* sp. *Journal of Natural Products* (2008) 71: 22 – 27
- ❑ Noro, J. N., Buguni, T. S., Barrows, L., Koch, M., Pond, C., Matainaho, T., Gideon, O., Piskaut, P., Ireland, C. M. Tetrahydroxysqualene from *Rhus taitensis* shows antimycobacterial activity against *Mycobacterium tuberculosis*. *Journal of Natural Products* (2008) 71: 1623 – 1624
- ❑ Diaz-Marrero, A., Matainaho, T., van Soest, R., Roberge, M., Andersen, R. Scalarene-based metabolites isolated from the antimitotic extracts of the marine sponge. *Hyrtios erectus*. *Natural Product Research* (2008) 22: 1304 – 1309
- ❑ Owen, P. L., Caves, D., Martineau, L.C., Haddad, P.S., Matainaho, T., Johns, T. Consumption of guava (*Psidium guajava* L.) and noni (*Morinda citrifolia* L.) may counter betel quid diabetogenicity in coastal Papua New Guinea. *Asia Pacific Journal of Clinical Nutrition* (2008) 17 (4): 635 – 643
- ❑ Williams, D.J., O'shea, M., Daguerre, R.L., Pook, C.E., Wuster, W., C.J. Hayden, C.J., Mcvay, J.D., Paiva, O., Matainaho, T., Winkel, K.D., Austin, C.C. Origin of the eastern brownsnake, *Pseudonaha textilis* (Dumeril, Bibron and Dumeril) (Serpentes: Elapidae: Hydrophiinae) in New Guinea: evidence of multiple dispersals from Australia, and comments on the status of *Pseudonaja textilis pughii* Hoser 2003. *Zootaxa* (2008) 1703: 47 – 61
- ❑ Barrows, L.R., Powan, E., Pond, CD., Matainaho T. Anti-TB activity of *Evodia elleryana* bark extract. *Fitoterapia* (2007) 78: 250 – 252.
- ❑ Carr, G., Raszeki, M., Soest, R., Matainaho T., Shopik, M., Holmes, C., Andersen, R.J. Protein phosphatase inhibitors isolated from spongia irregularis collected in Papua New Guinea. *Journal of Natural Products* (2007) 70: 1812 – 1815.

- ❑ Case, R., Wang, Y., Franzblau, S.G., Matainaho T., Piskaut, P., Soejarto, D., Pauli, C.F. Advanced applications of counter-current chromatography in the isolation of anti-TB constituents from *Dracaena angustifolia*. *Journal of Chrommatography A* (2007) 1151: 169 – 174.
- ❑ Desjardine, K., Pereira, A., Wright, H., Matainaho T., Kelly, M. Andersen, R. Tauramamide, a lipopeptide antibiotic produced in culture by *Brevibacillus laterosporus* isolated from a marine habitat: structure elucidation and synthesis. *Journal of Natural Products* (2007) 70: 1850 – 1853
- ❑ Nun, T. Nun., Kroll, D. K., Oberlies, N. H., Soejarto, D. D., Case, R.C., Piskaut, P., Matainaho T., Hilscher, C., Wang, L., Dittmar, D. P., Gao, S. J., Damania, B. Development of a Fluorescence-based assay to screen antiviral drugs against Kaposi's Sarcoma-associated herpes virus. *Molecular Cancer Therapeutics* (2007) 6 (8): 2360 – 70.
- ❑ Owen, P.O., Matainaho T., Sirois, M., Johns, T. Endothelial cytoprotection from oxidized LDL by some crude Melanesian plant extracts is not related to their antioxidant capacity. *Journal of Biochemical & Molecular Toxicology* (2007) 21 (5): 231 – 242.
- ❑ Powan, E., Pond, C., Barrows, L., Matainaho, T. Anti-TB activity of *Evodia elleryana*: A Medicinal plant from Manus Province. *Med. Sc. Bull.* (2007) 4: 52 – 53
- ❑ Brastianos, H.C., Vottero, E., Patrick, B.O., Van Soest, Matainaho T., Mauk, A.G., Andersen, R.J., Exiguamine A, an indoleamine -2-,3- dioxygenase (DDO) inhibitor isolated from the marine sponge *Neopetrosia exigua*. *J Amer. Chem. Soc.* (2006) 128: 16046-16047.
- ❑ Diaz-Marrero, A. R., Austin, P., Van Soest, R., Matainaho T., Roskelley, C.D., Roberge, M., Andersen, R., Avinosol, a meroterpenoid-nucleoside conjugate with antiinvasion activity isolated from the marine sponge *Dysidea* sp. *Organic Letters* (2006) 8: 3749 – 3752
- ❑ Wegerski, C.J., Sonnenschein, R.N., Cabriales, F., Valeriote, F.A., Matainaho T., Crews, P. Stereochemical Challenges in Characterizing Nitrogenous Spiro-Axane Sesquiterpenes from the Indo-Pacific Sponges. *Amorphinopsis and Axinyssa*. *Tetrahedron Lett.* (2006) 62: 10393 – 10399.

- ❑ Hehonah NT, Popon J and N. Willie. "Using High Performance Liquid Chromatography to Quantitate Artemether and Artesunate Anti-malarial tablets in the National Capital District, Papua New Guinea: *Pacific Journal of Medical Sciences*, Vol 7, No. 1, 2010; pages 4-13.
- ❑ Temu P, Temple VJ, Saweri A and Saweri W. Thiamine (Vitamin B1) Status of Boarding School Students in the Southern Region of Papua New Guinea. *PNG Med J.* 2009 Mar-June, Vol. 52, No. 1-2, 21 – 27.
- ❑ Temple VJ "Status of HIV related food and nutrition research in PNG" In *Proceedings on Consultation workshop on HIV Food and Nutrition in PNG*, NDOH and Albion Street Centre Publication, 2008, Sydney and Port Moresby.
- ❑ Fabila F, Temple VJ, Linge D, Kevau I, Ipai L. "Prevalence of Microalbuminuria in diabetic and hypertensive patients attending clinics in Port Moresby General Hospital", *Pac. J. Med. Sci*, Vol. 5; 2008; 22 – 33.
- ❑ Temple VJ Adherence to highly active antiretroviral therapy: Is nutrition an issue? *Pac. J. Med Sci.* Vol. 8, 2008; 65 – 70.
- ❑ Temple VJ, Haindapa B, Turare R, Masta A, Amoa AB, Ripa P "Status of Iodine Nutrition in Pregnant and Lactating Women in National Capital District, Papua New Guinea. *Asia Pac J Clin Nutr*: Vol. 15 (4), 2006: 533 – 537.
- ❑ Ilaisa S, Temple VJ, Saweri W, Lloyd A. "Nutrient and Energy Intake of People Living with HIV/AIDS in Port Moresby General, PNG: A 24-Hour Recall Study". *Med. Sci. Bull.* Vol 4, 2007: 16 – 26.
- ❑ Oge R, Temple VJ, Vince J, Ripa P. "Nutritional Status of Infants in the National Capital District of Papua New Guinea". *Med. Sci. Bull.* Vol. 4, 2007: 33 – 44.
- ❑ Pamu GH, Temple VJ. "Retrospective Assessment of Thyroid Function Tests Results Obtained in Port Moresby General Hospital in 2004 and 2005". *Med. Sci. Bull.* Vol 4, 2007: 45 – 51
- ❑ Temple VJ "Progress towards elimination of IDD in PNG" *International Council for Control of Iodine Deficiency Disorders. IDD Newsletter*, Vol. 22, No 4, Nov. 2006; 11 – 13.

All BMS staff members actively participate in the Bi-weekly Joint BMS–Health Sciences-Dentistry Seminar Series. Edited versions of the seminars were first published in the "Medical Science Bulletin". The 1st Issue of the Medical Science Bulletin (Med Sci Bull) was released in November 2003. The Med

Sci Bull metamorphosed into the now peer reviewed Pacific Journal of Medical Sciences (Pac. J. Med. Sci) published by the School of Medicine and Health Sciences. Two issues of the Pac. J. Med. Sci. (PJMS: ISSN 2072 – 1625) is published yearly. The web site of the PJMS is www.pacjmedsci.com. This is the first academic journal published in the UPNG that can be accessed on line.



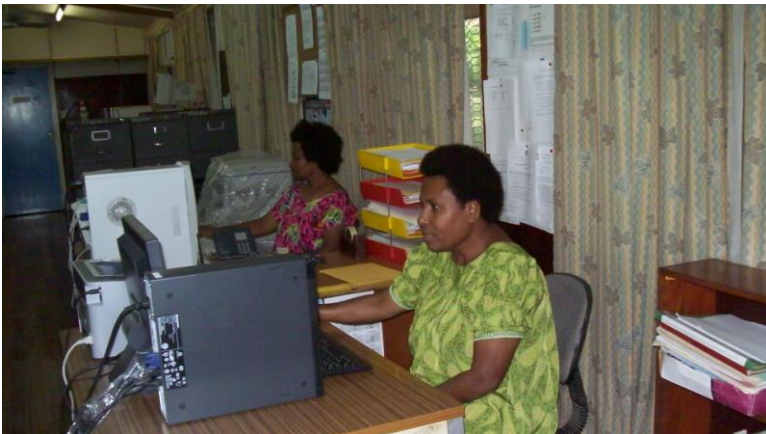
HPLC set up in the BMS Research Laboratory (Mr. Sam Grant: BMS Chief Technical Officer at work)



The ELISA (EIA) Reader and Washer in the BMS Research Laboratory (BMS CTO Mr. Sam Grant at work)



Postgraduate students at work in the Molecular Biodiscovery and Biomedicines Research Laboratory (MBBRL)



The Secretary (Ms Theresa Dunamb) in the Division of BMS at work



A student working in the Micronutrient Research Laboratory in BMS under supervision of Prof. V. J. Temple