

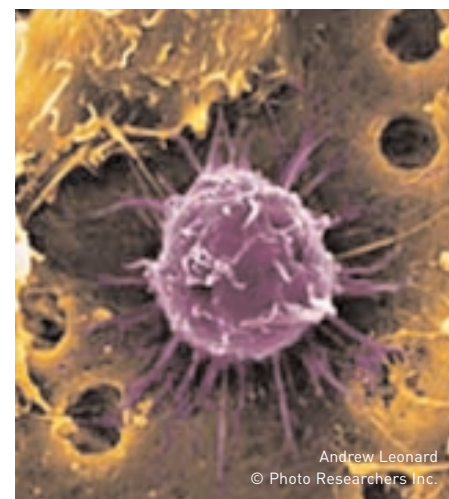
LABS: the heartbeat of clinical process | A LOOK AT FOUR AMAZING SERVICES

Have you ever wondered how a particular service started or whether it will continue? In this issue of Inside Insight we highlight four services that are beyond the core diagnostic business of SEALS. In each case a passionate laboratory champion supported the clinical need to help forge a dynamic partnership between clinicians, pathologists and scientists to improve patient care.

In each case an idea sparked by research was translated to a robust service that is responsive to specific needs in the Area.

The systemic support of SEALS in quality management and compliance with regulators has assisted in initiating and mainstreaming these services so that they are reliable, funded and durable.

The stories about the Bone Marrow Transplant Unit and Andrology at Randwick, the NSW Bone Bank at Kogarah and the Bowel Scan collaboration with Rotary at Sutherland highlight the focussed, clinical nature of these special services supported by SEALS.



Andrew Leonard
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An adult stem cell collected from human bone marrow. It can replace blood cells killed by cancer or cancer treatments like radiation and chemotherapy.

From the mid '80s to the mid '90s the unit introduced a procedure for removal of lymphocytes from haemopoietic stem cell grafts that was unique to the southern hemisphere. This protocol allowed patients who did not have a compatible donor to receive a transplant.

The unit now provides a comprehensive service for the Sydney Children's Hospital for both allogenic and autologous transplants to a standard where patients from interstate and New Zealand are referred for difficult procedures.

An autologous transplant program at the Prince of Wales Hospital involves the Unit in the treatment of about 50 patients per year.

Continued page 2

Test and Teach Case

The following blood results were obtained from a 63 year old female prior to cardiac surgery. Patient complained of lethargy and easy bruising over the last six months. Physical examination was normal and there was no history of recurrent infection.

HAEMATOLOGY

Hb	128 g/l	(115-165)
WBC	13.04 X 10 ⁹ /L	(3.50-11.00)
PLT	99 x 10 ⁹ /L	(150-450)
LYMPH ABS	8.1 x 10 ⁹ /L	(1.5-4.0)
Smudge Cells	present	

CLINICAL CHEMISTRY

Protein	55g/l	(61-79)
Albumin	33 g/l	(33-48)
Calcium	2.05 mmol/l	(2.25-2.58)

IMMUNOLOGY

Reference ranges are in brackets.

IgA	0.31 g/l	(0.59-3.96)
IgG	2.09 g/l	(7-16)
IgM	0.10 g/l	(0.48-3.04)
IgG1	1.39g/l	(4.9-11.4)
IgG2	0.64 g/l	(1.50-6.4)
IgG3	0.20g/l	(0.20-1.10)
IgG4	0.05 g/l	(0.08-1.40)

What is your provisional diagnosis?

What additional investigations are relevant?

Why?

See page 3 for discussion

Furthermore, they illustrate once again that public pathology at its best is much more than an ancillary organ in our protean health system. Laboratory medicine lies at the heart of the clinical process: diagnosis, understanding of disease pathogenesis, clinical management and quality control.

BMT closes diagnosis-treatment loop

The role of pathology laboratories in diagnostic testing is well understood. However their other role in the treatment of patients is perhaps less widely appreciated. Such clinical involvement transcends the rather limited view of laboratories simply as diagnostic test factories and is better described as "laboratory medicine".

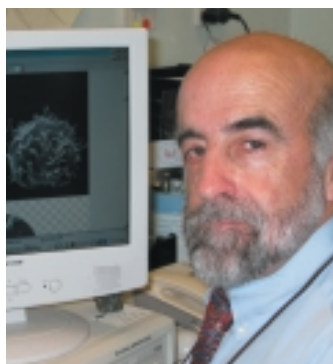
Bone marrow transplantation is one of several areas where SEALS laboratories are involved in diagnosis of disease and then in collaboration with clinicians, in the treatment of patients.

In 1975, the first allogenic bone marrow transplant for haematological malignancy in Australia was performed at the then Prince of Wales Children's Hospital (now Sydney Children's Hospital). The small research arm of the Haematology Department assisted in the laboratory aspects of that procedure.

The Bone Marrow Transplant Unit was then formed and became the first laboratory in NSW to cryopreserve bone marrow for autologous transplantation.

In this issue...

- Four amazing services: BMT, sperm bank, bone bank & bowel scans
- Viewpoint: advances rely on interaction
- Quality: how long is a piece of string?
- Syd Bell, Professor of Microbiology
- Non-specific allergy testing obsolete
- Clinical trials – make it happen!



David Ford in the Bone Marrow Transplant Unit.

Mr David Ford
Principal Scientist
SEALS Bone Marrow Transplant Unit,
Randwick

Sperm bank at women's hospital

Andrology serves a range of clinics mainly centred in the Royal Hospital for Women at Randwick. Investigation of infertility requires seminal analysis and sperm function testing. Intra-uterine insemination requires semen to be specially processed to assist fertilisation. Sperm banking is available for males undergoing cancer therapy and for the Donor Sperm Programme. Storage of ovarian tissue is also available.

Laboratory accreditation, adequate staffing levels, development, training and economic operation were driving factors that have resulted in the absorption of Andrology into EastPath, then SEALS, firstly within Microbiology until now, Haematology. Within the precincts of RHW, the laboratory provides convenient access to staff and patients in that facility as well as other local practitioners. SEALS Andrology is another example of a sustainable, accredited, quality service delivered in collaboration with clinical partners.



Mr Chris Nicol
Senior Scientist
Andrology

Them bones, them bones...

Like blood transfusion and bone marrow transplants, bone implantation is now a therapeutic device regulated by the Therapeutic Goods Authority (TGA).

As such, its use calls for close collaboration between clinicians and their colleagues in medical laboratories. In addition to SEALS' NATA and ISO quality accreditation, TGA licensing is required for all work practices associated with the bone bank - from bone retrieval to associated testing of donors, sterilization and storage of bone before implantation.

The NSW Bone Bank at St George Hospital receives up to 200 femoral heads from live donors and will shortly retrieve multiple long and flat bones as well as tendons from multi-organ donors.

Aseptic removal and storage of implantable tissues is the aim of retrieval, with nil or minimal levels of microbial bioburden. The maximum permitted exposure of bone tissue to gamma-irradiation has been matched against a maximum allowable bioburden level if sterility is predicted from that irradiation dose. SEALS Microbiology plays an important role in estimating the microbial bioburden of each bone before exposure to gamma-irradiation. New quantitative methods developed by SEALS Microbiology at Kogarah will ensure continuing compliance with its TGA licence when additional samples are received.

These achievements are the result of close collaboration with Bone Bank staff which extends beyond the testing process. It embraces all the logistics for secure identification of samples submitted for testing collection, labelling, transport and storage - to ensure traceability of all tissues from source to recipient. Since March 2003 SEALS' TGA licence has been extended to bone samples received from the ACT Bone Bank for bioburden testing.

Mrs Kerry Varetas
Senior Scientist
SEALS Microbiology, Kogarah

Community collaboration on bowel scans

In a drive against bowel cancer, Central Specimen Reception (CSR) at SEALS' Sutherland campus has entered into a noteworthy collaboration with the Rotary Club, GPs and the community in Sutherland Shire.

As part of Rotary's wider Bowel Scan initiative, promotion of the campaign against colon cancer is advertised in rates notices going to local residents while participants from previous years are reminded about screening by letters sent out by CSR.

Rotary sells the test kits through local pharmacies and collects the used kits for laboratory testing by SEALS. Staff in CSR then enter patient information into the laboratory information system, conduct the testing and send the results to the Rotary medical co-ordinator and the patient's GP. SEALS also sends letters to all participants where their test was found to be negative.

CSR manager Anita Burnie describes the project over the past two years as a "full on job" with over 2400 kits being tested between March and May in this year alone and with 39 positive results. Follow-up is being conducted with GPs to determine the incidence of bowel cancer in the group testing screen positive. ■

Ms Anita Burnie
CSR Manager,
SEALS Sutherland



A "bowel scan" sample delivered to CSR at SEALS Sutherland.

EDITORIAL

Inside Insight is the quarterly clinician newsletter of the South East Area Laboratory Service (SEALS).

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Test and Teach answers

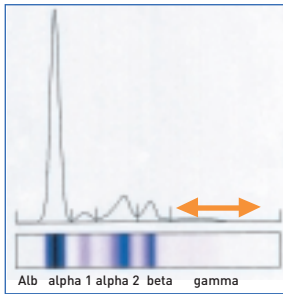


Figure 1. Serum Protein EPG and densitometry scan showing suppression of the gamma globulin region indicated by orange arrow.

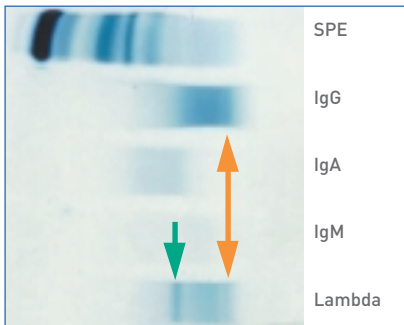


Figure 2. Serum Immunofixation showing detection of BJP band (free lambda light chains) indicated by green arrow and two monoclonal IgG lambda bands indicated by orange arrow detected.

Chronic lymphocytic leukemia (CLL) is the most common adult B-cell tumour. CLL is likely to be diagnosed when unexpected elevation of absolute lymphocyte count is discovered on a complete blood cell count. Median age range of diagnosis is 60 to 68 yrs (F:M, 1:1.8). The appearance of smudge cells, a blood film artifact, aid in the diagnosis. B-cell lymphomas are verified by flow cytometry.

Hypo-gamma globulinemia and weak monoclonal immunoglobulins are a frequent finding in CLL. CLL cells have immunoregulatory activity and serum Ig falls slowly with disease progression. It has been postulated that the cell of origin of CLL may be a regulatory B cell. The serum EPG confirmed the immunoglobulin suppression (Figure 1). Immunofixation of the serum (Figure 2) with its increased sensitivity identifies three monoclonal bands as 2 x IgG lambda bands in the gamma globulin region and a free lambda light chain in the beta globulin region. Further testing of the urine would confirm the presence of Bence Jones Protein (BJP). Urinary excretion of BJP has been correlated with tumour load and is a feature of patients with more aggressive disease.

Patients with CLL may encounter numerous complications including infections, autoimmune disease, secondary malignancy and transformation to large B-cell non-Hodgkin lymphoma or Hodgkin lymphoma.■

Dr Desiree Berry, Principal Scientist, SEALS Centre for Immunology, Sutherland

References:

- Tait D. et al. 'Current Approach to Diagnosis and Management of Chronic Lymphocytic Leukemia.' Myo Clin Proc. 2004; 79:388-398.

VIEWPOINT

Keep your eye on the main game

The interaction of clinicians, pathologists and scientists in the public hospital system and its affiliated university medical schools has spawned a plethora of advances in the diagnosis and management of disease that are now taken for granted. It would be counterintuitive to think that there will be no more advances; rather, change may occur at an even faster pace and will continue to depend on close links between these groups.



Pathology is a scientific discipline using technology to achieve its goals, just as surgeons use instruments to achieve their purpose. Multi-disciplinary clinico-pathological reviews occupy an increasing proportion of anatomical pathologists' time. The majority of pathologists in the other disciplines now undertake dual training and practice as physicians and pathologists in haematology, immunology, endocrinology, clinical chemistry, and microbiology. This is the modern public pathology service model, which has been so successful in enhancing the capability, standards, safety, and cost effectiveness of patient care.

Under the government's health reform program, delivery of public pathology services in NSW seems destined to change in ways that are still unclear. Clinicians in our hospitals have rejected the notion that the pathology they need to help look after the most complex medical problems can be provided remotely by anonymous laboratorians. The key role and the mission of public pathology may be challenged. Your voice may need to be heard to keep your pathology service within the clinical governance model which ensures clinical effectiveness and patient welfare. It is important that any changes made are the right changes for the right reasons.■

Dr Roger Wilson
Executive Medical Director, SEALS

QUALITY CORNER

CONFIDENCE IN RESULTS

How long is a piece of string?

The word "uncertainty" generally does not inspire confidence. However, "uncertainty of measurement" or "measurement uncertainty" is defined in the NATA Technical Circular, "a parameter associated with the result of a measurement, that characterises the dispersion of the values that could reasonably be attributed to the measurand".

If you measure the distance between two points repeatedly, do you get the same result each time? If this process is repeated using different measuring equipment and then by different people, are results the same?

Factors contributing to uncertainty of measurement in the analysis of tests include, but are not limited to sampling, equipment, calibrators, reference material, staffing, test environment and method used. These factors need to somehow be quantified.

Shortly, medical laboratories assessed to ISO/IEC 17025 (1999) will be required to estimate and report the uncertainty of measurement for quantitative tests, providing an indication of the quality and reliability of the result. It will also permit better comparison of results from different laboratories.■

Ms Ivy Fong, SEALS Quality Manager

Sydney Bell Professor of Microbiology



Sydney Bell, SEALS Professor of Microbiology, first became interested in medicine as a small boy. His father suffered from rheumatic fever contracted during his service in WW1 and Sydney visited him at Randwick Repatriation Hospital. When he was seven years old, his father died.

Life was a struggle in the not so popular suburb of Clovelly. Vivid memories of the Japanese shelling of Bondi during WW2 added to the less desirable aspects of the coastal suburbs – a world away from the café societies they are today.

Prof Bell's academic career started at Clovelly Public School, then Sydney Boys High where 'shoes were compulsory' and he graduated in medicine from Sydney University in 1956. His career in Microbiology started in 1963 and has continued for 41 years. His clinical interest in the treatment of osteomyelitis is a continual driving force and the laboratory work on antibiotic susceptibility testing is a major achievement.

Prof Bell has a vast list of achievements in the administration of Pathology. In 1986, as Associate Director of Pathology and Chairman of Microbiology, he was asked to set up EastPath as a business unit of which he became Executive Medical Director. Eastpath was the first NSW government agency allowed to retain revenue.

SEALS was formed in 1996 under harsh economic constraints. Under Prof Bell's directorship to 2001, streamlining of SEALS covered the networking of computer services, restructuring the financial management, establishing area services across all departments of Pathology, and incorporating several peripheral laboratories. However since he has stopped running SEALS he feels a 'weight has been lifted' that was not obvious at the time as 'none of it was easy'.

Prof Bell finds his career very satisfying. Microbiology is his first love and he is justifiably proud of his achievements.

Dr Desiree Berry, Principal Scientist, SEALS Centre for Immunology, Sutherland. ■

CLINICAL TRIALS – make it happen!

The appointment of a Clinical Project Manager in SEALS two years ago has meant that many of your clinical trials are now proceeding in a more reliable and consistent manner with the assistance of SEALS resources.

Processes are now well established for protocol review, specimen processing, laboratory testing and dispatch. SEALS offers researchers a reliable laboratory service which is also fully NATA accredited to the ISO 17025 standard and meets the principles of Good Clinical Practice (GCP).

Researchers have sought SEALS involvement for more than 230 projects during the last two years. Approximately 40 projects are currently active.

SEALS will continue to make its resources available to researchers and will endeavour to widen its involvement in the area of clinical trials as we meet new opportunities within the new area health boundaries. ■

Mr Keith Westbury, Senior Scientist,
SEALS Trials Manager

RAST NO LONGER RATIONAL

Allergen-specific IgE was previously described as RAST - RadioAllergoSorbent Test. This is a trademark for obsolete technology.

Indications for allergen-specific IgE testing include: severe allergic reactions, where there is a risk of anaphylaxis associated with skin testing; dermatographism (where all skin prick tests will be falsely positive); patients on long term steroids, antihistamines or other immunosuppressive therapy which may mask the allergic response; and patients with severe skin disease.

There are a large number of allergen-specific IgE tests available and the choice of the appropriate test should be directed by the clinical history. Where there is good historical evidence based on a careful assessment that a specific allergen may be the trigger (e.g. peanuts), then an allergen-specific IgE test confirming this should be performed.

Food allergies should be distinguished from food intolerances. Patients with specific food allergies such as reactions to seafood should be tested by an allergen-specific IgE test (e.g. "seafood mix"). Food intolerance is best assessed by placing the patient on an elimination diet and then performing dietary challenges.

Where it is suspected that aero-allergens are precipitating an allergic response, such as in hay fever and asthma, then an allergen-specific IgE test to common aero-allergens, such as house dust mite or grass mix, should be selected.

Non-specific testing for allergens (eg. requesting "RAST") is expensive and inappropriate. Non-specified tests for RAST will be tested for House Dust Mite (HDM) and grass pollen allergens only. ■

Prof. Denis Wakefield
Director, SEALS Sutherland
Centre of Immunology