Enzymun-Test®
System ES 22
the new automated immunological assay system
A New Dimension in Bacterial Antigen Detection

WELLCOGEN

Six latex agglutination kits for the rapid detection of soluble bacterial antigen.

Wellcogen Strep B
Wellcogen H. influenzae b
Wellcogen S. pneumoniae
Wellcogen N. meningitidis ACYW135
Wellcogen N. meningitidis B/E. coli K1
Wellcogen Bacterial Antigen kit

A wide variety of differing bacterial species have been incriminated as the causes of both meningitis and bacteraemia in man.

Many of these bacteria possess soluble polysaccharide antigens which diffuse into the CSF and blood stream and are excreted in the urine. The detection of these soluble antigens in body fluids provides important information which can be used to reveal the identity of the infecting agent.

A choice of Body Fluids offers a more versatile system

The Wellcogen range of kits can be used to detect antigen in: CSF, SERUM, URINE, BLOOD CULTURE.

Standardised Procedure.
No matter which body fluid is under investigation the preparation steps are convenient and easy to perform using existing laboratory equipment.

A rapid result in an urgent situation.

By detecting soluble antigen in as little as 15 minutes from receipt of the sample, the Wellcogen kits are ideally suited for use during the day or in an out-of-hours work situation, whenever an urgent result is required.

Wellcome Diagnostics
Wellcome New Zealand Limited
P. O. Box 22-258 Otahuhu,
Auckland 6.

or Circle 134 on Readers Reply Card
When you mention progressive diagnostic systems, you’re really talking about Behring

Take the Enzygnost®-tests for example, a part of the world wide success of the Behring ELISA System

Enzygnost, the widest range of ELISA-tests in medical microbiology, is the sum of

- easy handling
- reliability
- compactness
- high throughput
- high specificity and sensitivity
- automation - realized in divisible microtitration plates

Enzygnost HBsAg) micro,
Enzygnost Anti-HBs,
Enzygnost Anti-HBc,
Enzygnost Anti-HBc (IgM*)
Enzygnost HBe,
Enzygnost Anti-HTLV III

Enzygnost Rubella,
Enzygnost Rotavirus (Ag),
Enzygnost Anti-Cytomegalovirus,
Enzygnost Anti-HSV,
Enzygnost Varicella/Zoster,
Enzygnost Toxoplasmosis (IgG),
Enzygnost Measles,
Enzygnost Parotitis,

Enzygnost Aujeszky,
Enzygnost Bovine Leucosis,
Enzygnost IBR/IPV

* available soon

Behring Diagnostics Section.
Hoechst New Zealand Limited
C.P.O. Box 67 Auckland
Phone 578-068. Telex 2338

or Circle 135 on Readers Reply Card
# TABLE OF CONTENTS

**Original Articles**

A Simple Standardised Method for the Preparation of Pure Fab Fragments of Rabbit Immunoglobulin G .......................... 38

A G Benny, R Limts, S M Henry

Safety in NZ Medical Laboratories — A Survey .......................... 40

J Parker

Comparison of the Relative Specificities of Six Enzyme Immunosorbent Assays for HIV-1 Antibody Detection .......................... 44

P M Austin, I W Steed

Medical Laboratory Technology Training in the Netherlands .......................... 48

R W L Sebers, H E E Benjamins

A New Zealand Technologist in Peru .......................... 57

W L Johnk

NZIMLT 42nd Scientific Meeting — Registration Form .......................... 33

1986 Eli Lilly Award — Report on the South Pacific Congress .......................... 63

The Pacific Way .......................... 55

North of the Bombay Hills: What's Happening in Haematology .......................... 58

H S 48 Amendments .......................... 61

Microbiology Wet Workshop .......................... 67

Letters to the Editor ................................................ 54

For Sale ................................................ 59

Institute Business ................................................ 60

New Products & Services ................................................ 62

Situations Vacant ................................................ 63

Work Wanted ................................................ 63

Wanted to Purchase ................................................ 63

Intending contributors should submit their material to the Editor, D. Dixon-McIver, Biochemistry Laboratory, National Women's Hospital, Auckland, New Zealand, or The Editor, P O Box 35-276, Auckland 10, New Zealand, Acceptance is at the discretion of the Editor, and no undertaking is given that any article will be published in a particular issue. The copy deadline for each issue is the first of the month prior to the month of publication.

**ADVERTISER ENQUIRIES**

Inquiries regarding advertising rates and copy or blocks for advertising should be addressed to the Advertising Manager, Trish Reilly, 48 Towai St, St Heliers, Auckland 5, Phone 555-057.

**DATES OF PUBLICATION**

The months of publication for 1987 are March, May, August and November.

Subscriptions to the Journal for non-members requiring delivery in New Zealand is $NZ30.00 for 1 year surface mail paid. Single issues are $NZ10.00 surface mail paid.

Subscription to the Journal for non-members requiring delivery overseas is $NZ30.00 for 1 year plus $NZ4.20 surface mail paid. All subscriptions except for single issues are due in February.

**DIRECTIONS FOR CONTRIBUTORS**

From Vol. 36 No. 1 all papers published will be in the form known as “Vancouver Style” or Uniform Requirements for Manuscripts submitted to Biomedical Journals. Full details may be found in the New Zealand Journal of Medical Laboratory Technology, Vol. 36, No. 4, page 90 to 109 or from the Editor.
A Simple Standardised Method for the Preparation of Pure Fab Fragments of Rabbit Immunoglobulin G

A.G. Benny, Scientific Officer, Robyn Lints, Research Assistant, S.M. Henry, Technologist.
Developmental Laboratory, Auckland Blood Transfusion Service, Park Ave, Auckland, New Zealand.

Correspondence to: A.G. Benny, Blood Transfusion Service, c/o Auckland Hospital, Private Bag, Auckland, New Zealand.

Abstract
A simple, standardised and rapid method for the preparation of Fab fragments of rabbit IgG is described. Specific Protein A binding IgG is prepared by ion exchange chromatography on DEAE cellulose followed by affinity chromatography on Protein A-Sepharose. The IgG is cleaved to yield Fab and Fc fragments by incubation with standardised papain. The Fab fragments are recovered from the incubation mixture by chromatography on Protein A-Sepharose. Under optimal process conditions 60% of the initial IgG antibody activity may be recovered as Fab fragment activity. Fc fragments and undigested IgG are undetectable in the Fab fragment fraction.

Key words:
Fab, rabbit IgG, Protein A.

Introduction
The preparation of Fab fragments of rabbit IgG by simple limited proteolysis of the IgG molecule with papain was originally reported by Porter1. This procedure is widely used for the preparation of fragments for use in ELISA assays2 and antibody binding site studies3. A number of modifications of the original method aimed at simplifying the preparation and purification of Fab fragments have been described4-6. We report our experience with recently published methods and a modification of the procedure to standardise and further simplify the preparation of high purity Fab fragments of rabbit IgG.

Methods
Antisera were either prepared in rabbits using standard immunisation procedures5 or purchased from Dakopatts, Denmark. Gel filtration and DEAE-cellulose chromatographic media were from Phoenix Chemicals Ltd, N.Z. Sephacryl S-200 and Protein A-Sepharose were obtained from Pharmacia, Sweden. A trial batch of Protein A-Sepharose was also obtained from the Biochemical Processing Centre, DSIR, N.Z. Chromogenic substrate H-D-Pro-Phen-Arg-pNA was obtained from the Dept of Chemistry and Biochemistry, Massey University, N.Z. Goat anti-rabbit IgG and Papain Type IV (2x crystallised) were from Sigma Chemical Co. USA Disposable column ultrafiltration concentrators were from Millipore, USA.

Papain assay
Papain was assayed using the chromogenic peptide substrate H-D-Pro-Phen-Arg-pNA in a kinetic cellulose reaction system. The assay contained 1.000 µl buffer (0.01 M Na2PO40.15 M NaCl-0.01 M EDTA-0.25 M B-mercaptoethanol pH 7.4) and 20 µl of papain (diluted 1:500 in assay buffer). The reaction was incubated at 37°C in a thermostatted cuvette for 3 min. The reaction was started by the addition of 100 µl of pre-warmed 0.002 M chromogenic substrate. The reaction was monitored in a Shimadzu UV 160 spectrophotometer at 405 nm using the kinetic rate reaction mode. The rate of change of absorbance over the first 3 min of the reaction was converted to pmoles of pNA released per min using a molar absorptivity coefficient for pNA of 9920 L/mol/cm.

Preparation of Fab fragments
An immunoglobulin fraction of the antisera was prepared using ion exchange chromatography on DEAE-cellulose with 0.02 M Na2PO4 buffer pH 7.1. The immunoglobulin fraction (10mg) is loaded on a 10mm x 60mm column of Protein A-Sepharose equilibrated in 0.15 M Na2PO4-NaCl pH 7.4 (PBS). Non-Protein A binding IgG is eluted with start buffer and may be discarded. Bound IgG is eluted with 0.1 M glycine pH 3.0 and the pH of the eluate immediately adjusted to pH 7.4 with solid Tris base. The protein A column is re-equilibrated in PBS. EDTA and B-mercaptoethanol are added to the eluate to final concentrations of 0.001 M and 0.025 M respectively. Papain is added in a ratio of 0.2 - 0.4 mmol pNA activity per mg IgG and the mixture is incubated at 37°C for 60 min. The proteolysed IgG is loaded directly on the Protein A-Sepharose column and the column eluted with PBS. Fab fragments are eluted with start buffer, concentrated to 5 mg/ml by ultrafiltration and dialysed against PBS containing 0.1% NaCl, overnight at 4°C. Fc fragments and any undigested IgG are recovered from the column by elution with 0.1 M glycine pH 3.0. The column is then re-equilibrated in PBS.

Analysis of papain digest
The extent and specificity of the papain proteolysis of rabbit IgG was determined by SDS-polyacrylamide gel electrophoresis essentially as described by Weber and Osborne6 and immunoelectrophoresis, crossed immunoelectrophoresis, crossed immunoelectrophoresis and tandem crossed immunoelectrophoresis against Goat anti-rabbit IgG. The antibody activity of the Fab fragments was estimated from the ability of the preparation to inhibit intact IgG antibody binding antigen in a standard rocket immunoelectrophoresis assay as modified by Porter1.

RESULTS
Typical elution curves of a rabbit immunoglobulin fraction on Protein A Sepharose before and after papain treatment are shown in Figure 1. Less than 1% of the protein in the untreated fraction is eluted from the column under start buffer conditions whereas over 80% of the protein in the papain treated fraction is not bound to the Protein A. The effective recovery of total protein and antibody activity at each stage of the process is shown in Table 1.

Freshly reconstituted Sigma papain (10 mg/ml in PBS) was
assayed at 20 pmol pNA activity per min per μg. Thawing and refreezing of the frozen stock solution resulted in less than 5% loss of activity. The frozen solution was stable for up to 1 month.

The optimum ratio of papain to immunoglobulin was found to be 0.39 mmol pNA activity per mg IgG. Lesser amounts of papain resulted in increased levels of non-proteolysed IgG. Addition of 1.0 mmol pNA activity per mg IgG results in detectable non-specific proteolysis, an increase in the content of non-active fragments in the Fab fraction and a consequent reduction in the yield of antibody activity. The final stabilised Fab fragment preparation lost no detectable activity over a 12 month period when stored undiluted at 4°C. Long term storage of the preparation diluted to a working assay concentration resulted in significant loss of Fab activity.

SDS-Polyacrylamide electrophoresis of the Fab fraction under non-reducing conditions indicated a single protein band having a molecular weight of 50,000 ± 5,000 daltons.

Analysis of the Fc and Fab fractions by crossed immuno-electrophoresis and tandem crossed immuno-electrophoresis against goat anti-rabbit IgGs showed in Figure 2. The Fab fraction contains only one component whereas the Fc fraction contains both Fc antigen and some Fab antigen (as non-proteolysed IgG).

Following the successful development of the manual process a semi-automated chromatographic system utilising solenoid valves and a Pharmacia Frac 100 fraction collector was developed. This system resulted in a total process time for preparation of Fab fragments, excluding the papain incubation and final diauxis, of one hour. The automated process gave the same recovery and purity of Fab fragment as the manual process.

Discussion

The method we have developed for preparation of Fab fragments is simple, readily standardised, rapid and results in a consistent recovery of high purity Fab fragments. Although primarily used for the preparation of Fab fragments of rabbit anti-human IgG, initial results indicate that the recovery of active fragments of other animal antibodies with other specificities is accomplished using essentially the same reaction and column elution conditions.

The Protein A column was able to be used without significant loss of binding for at least 50 column cycles. The recovery of active Fab fragment fraction was dependent primarily on the ratio of papain to IgG. Unless the capacity of the Protein A column was exceeded only, Fab fragments were detected in the start buffer eluate of the Protein A column run of the proteolysed IgG. The chromogenic peptide substrate assay for papain allowed close standardisation of each batch run and this resulted in a consistency in batch to batch recovery and yield of active Fab fragments. The Fab fragments prepared using this method have been used successfully in a modified Coombs test for the neutralisation of human IgG bound to red blood cells. The potential for scale up of the Fab process to a 1 L column of Protein A Sepharose capable of fractioning 2 L of immunoglobulin fraction is under development.

Acknowledgement

This project was supported in part by a grant from the New Zealand Institute of Medical Laboratory Technology to S.M.H.

References


Table 1

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Total protein (mg)</th>
<th>Protein recovery (%)</th>
<th>Immunological activity recovery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting antibody</td>
<td>10.7</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Pre papain treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbound Protein A</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Eluted Protein A</td>
<td>1.0</td>
<td>99</td>
<td>98</td>
</tr>
<tr>
<td>Post papain treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbound Protein A</td>
<td>6.4</td>
<td>60</td>
<td>68</td>
</tr>
<tr>
<td>Eluted Protein A</td>
<td>2.9</td>
<td>27</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 2

Crossed immuno-electrophoresis of Fab and Fc fractions of papain treated Rabbit IgG against Goat anti-Rabbit IgG.

a) Crossed immuno-electrophoresis of Fab fraction
b) Tandem crossed immuno-electrophoresis of Fc and Fab fractions.
Safety in N.Z. Medical Laboratories — A Survey
Jan Parker, ANZIMLT, BSc, Dip B Admin
Convenor, Safety Committee, NZIMLT Council

Introduction
Medical laboratories have long been aware of the hazards that exist in the working environment, both in terms of laboratory acquired infections and in terms of laboratory accidents. Grist in a study of infections in British clinical laboratories concluded that there appears to be scope for improvement in bacteriological bench techniques and numerous studies have been made which identify Hepatitis B as an occupational hazard for laboratory personnel. The advent of AIDS has resulted in a reassessment of laboratory practices and general upgrading of precautions taken to protect a possible at risk group of workers. Waldron speaks of the grave fears of contracting infection expressed by those whose work brings them in contact with blood or body fluids from patients with AIDS. A study by Hisch and his colleagues of 33 hospital employees who had accidentally exposed themselves to blood from patients with AIDS suggests that the risks are lower than those of contracting Hepatitis B but two other cases reported in the Lancet are less encouraging. Collins published a list of laboratory precautions designed to reduce the risks of working with pathological material and many of these have been incorporated into the working environment.

The 1985/6 wage round for hospital laboratory workers emphasised the importance placed on safety provisions with the availability of hepatitis vaccination and the provision of safe footwear for laboratory workers among the issues raised.

Survey Scope and Method
The purpose of the questionnaire was to assess the safety procedures that were followed in medical laboratories at the beginning of 1985 and determine what changes have occurred since then as a result of increased awareness of safety requirements. Section A defines safety procedures prior to January 1985. Section B defines current measures.

The questionnaire was distributed by mail in August 1986 to all medical laboratories in New Zealand, both public and private. The cutoff date for return was set at October 1st 1986 and the results were analysed. The mailing list was obtained from the Secretary of the N.Z. Institute of Medical Laboratory Technology. Wording of the questionnaire was discussed locally to remove possible ambiguities before the final format was arrived at. Included with the questionnaire was an introduction explaining the nature and purpose of the study.

Results
Response
92 questionnaires were distributed, 23 to private laboratories and 69 to hospital laboratories. Replies were received from 9 of the private laboratories and 63 of the hospital laboratories (Fig. 1). The lower return rate (43%) for private laboratories may relate to the fact that they do not come under the umbrella of the NZIMLT for wages and conditions and may have perceived such a survey as having no direct effect on them. The return rate of 91% for the hospital laboratories is very high for a postal survey of this type and may be attributed to the high interest in this subject.

Table 1: Distribution of Safety Cabinets

<table>
<thead>
<tr>
<th>Type</th>
<th>Prior to Jan 1985</th>
<th>August 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class II</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Class I</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Unspecified</td>
<td>8*</td>
<td>8*</td>
</tr>
<tr>
<td>None</td>
<td>41</td>
<td>31</td>
</tr>
</tbody>
</table>

*Two quoted as being inferior.

Footwear
The 1985/6 wage round saw a footwear allowance established on safety grounds for laboratory workers. Prior to January 1985 24 laboratories had any requirements for footwear in the laboratory although 13 of these only related to what could not be worn, e.g. no sandals or open shoes. Currently 48 laboratories have specific footwear requirements, most fairly comprehensive, e.g. closed heel and toe, flat no slip sole, leather upper. Of these laboratories 30 are receiving shoe and stocking allowance from their employers. Four laboratories without any requirements also indicated that they are receiving the allowance (Fig. 2). Centres not receiving any footwear allowance include all the private laboratories and a number of small hospital laboratories where the number of workers is low and their industrial muscle less.

Figure 2: Receipt of Shoe and Stocking Allowance

<table>
<thead>
<tr>
<th>Total Laboratories</th>
<th>No Footwear Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SS Allowance</td>
</tr>
<tr>
<td>30 (5%)</td>
<td>18 (37%)</td>
</tr>
<tr>
<td>43 (46%)</td>
<td>25 (44%)</td>
</tr>
</tbody>
</table>

Gloves
A joint working party on the prevention of infection in clinical laboratories emphasised that the wearing of gloves is the proper professional precaution where any spillage or contamination is likely. Prior to January 1985, 26 (36%) laboratories were using gloves routinely for handling potentially hazardous material. This number has now increased to 51 (70%) but more than 1/3 of these report some degree of allergy problem, usually in the form of skin rashes and contact dermatitis. Some laboratories reported particular brands of gloves as being more of a problem than others, apparently relating to the degree of powdering.

Safety Masks
Protection for the eyes is very important according to WHO and transmission by droplet transfer can occur through the conjunctiva but few laboratories use some form of safety mask or goggle routinely. Prior to January 1985, 20 (25%) laboratories used eye protection and the number is now 38 (49%) but many of the users indicated that usage was limited to TB work or that although such protection was available its use was not compulsory.

Safety Cabinets
Use of safety cabinets of all classes is increasing, from 44% of laboratories prior to January 1985 to 58% currently (Table 1) of those laboratories without safety cabinets only two reported having them on order. One laboratory had requested a safety cabinet in the design of their new laboratory but while the fittings had been put in the cabinet was not installed as the Hospital Board considered it too expensive at $7,000.

Uniforms
There has been a move throughout the country away from laboratory coats and towards the use of gowns (Table 2). Several laboratories stated however that gowns were only used for TB work. Five laboratories reported also using aprons and in several areas disposable gloves are provided for dealing with specimens from known AIDS patients.

Centrifuges
According to the ‘Howe’ code the use of sealed centrifuge buckets to reduce dissemination of droplets is required for adequate protection from Category B1, B2 and C micro-organisms and agents. Prior to January 1985 45 laboratories reported only having unsealed centrifuges. This number has now dropped to 30 but 59 laboratories
Table 2: Types of Laboratory Garment

<table>
<thead>
<tr>
<th>Pre Jan 1985</th>
<th>August 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coats only</td>
<td>41</td>
</tr>
<tr>
<td>Gowns only</td>
<td>14</td>
</tr>
<tr>
<td>Coats/Gowns</td>
<td>13</td>
</tr>
<tr>
<td>Uniforms</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3: Types of Safety Showers

<table>
<thead>
<tr>
<th>Pre Jan 1985</th>
<th>August 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>OH</td>
<td>4</td>
</tr>
<tr>
<td>HH</td>
<td>4</td>
</tr>
<tr>
<td>OH/HH</td>
<td>3</td>
</tr>
<tr>
<td>Unspecified</td>
<td>24</td>
</tr>
</tbody>
</table>

OH = Overhead  HH = Handheld

Table 4: Laboratory Disinfectants in Use Prior to January 1985

<table>
<thead>
<tr>
<th>Disinfectant</th>
<th>Alcohol</th>
<th>Glutaraldehyde</th>
<th>Sudol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medol</td>
<td>Janda</td>
<td>Milton's</td>
<td>nndot</td>
</tr>
<tr>
<td>Hypochlorite</td>
<td>Zorbol</td>
<td>Kemken</td>
<td>Savlon</td>
</tr>
<tr>
<td>Biophenex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyroneg</td>
<td>Mucocil</td>
<td>Alcide</td>
<td>Extran</td>
</tr>
<tr>
<td>Phenolics</td>
<td>Methanol</td>
<td>Chlorodux</td>
<td>Wavine</td>
</tr>
</tbody>
</table>

Hepatitis Vaccination

A number of studies have established the increased risk of Hepatitis B infection for paramedics. It has been shown that HBsAg can contaminate environmental surfaces, work benches and laboratory refrigerators. Dienstag concluded that even in the absence of recognisable invasion there remains an ever present but insidious Hepatitis B hazard. In a Seattle study found that paramedics at increased risk of Hepatitis B infection and recommended that vaccination should be considered for such workers. Two laboratories in this survey reported receiving vaccination about the beginning of 1985. Currently 43 have been vaccinated (62% of hospital laboratories and 40% of private laboratories) with a further 14 indicating that it is intended to be done. A breakdown of the dosages administered is shown in Table 5. A letter to the NZ Medical Journal in October 1985 recommended that in inoculation programmes of this type 4 mcg of H-B vax be considered the minimum allowable dose to obviate the risk of non-production of antibodies. A newsletter to principal or charge technologists from the NZIMLT (11 April 1986) cautioned workers "against receiving low dose (5 mcg or less) hepatitis vaccine as it may not prove effective." It is disturbing to find that 8 laboratories indicate receiving low dosage vaccination.

All small laboratories have either received or are to receive vaccination. Two major boards have not offered vaccination to staff, probably because of the costs involved, and one of these has informed that staff may elect to have vaccination at their own expense.

Health Checks

The use of routine chest X-rays has actually decreased from 25 to 16 with nearly half the laboratories reporting that these were only carried out on new staff or on staff currently performing TB work.

Fire Safety

The number of laboratories who have routine fire drills has remained the same at 30. One laboratory commented that they had so many false alarms they didn't need fire drills. Forty-two laboratories reported training staff in the use of fire extinguishers; although some commented that it was on a very infrequent basis. A similar number trained staff in use of CPR.

Safety Manuals

Forty-three laboratories (59%) had access to safety manuals with all the larger centres and some of the smaller ones having locally prepared manuals.

Other publications listed included:

- Lab Safety: Principles and Practices (Miller)
- Hospital Acquired Infections (C.H. Collins)
- People at Work, Their Health, Safety and Welfare (W.I. Glass)
- Clinical Laboratory Safety (S. Ross)
- The Howie Code Laboratory Safety Manual (WHO 1983)

Safety Requests Disallowed

1. Fire safety blankets and safety cabinet for TB (not given a priority by HOD)
2. Hands free wash basins
3. Staff facilities minimal or absent. Requests lobbed off by reference to long standing plans for a new laboratory
4. Hepatitis vaccination
5. Showers
6. Showers
7. HBsAg vaccination not denied but much foot dragging
8. Fume extraction Histology approved 1983 but not activated
9. Safety hood planned but not installed

Several laboratories made the point that they found their boards very supportive, particularly in relation to matters of safety.

Conclusion

It is obvious that in the period of time since the beginning of 1985 the standards of safety in medical laboratories have responded to the challenge. The numbers of staff wearing appropriate attire and the provision and standard of equipment for handling infectious material has improved. Decontamination of material before disposal or recycling is still less than satisfactory and it is worth reiterating Collins' statement that laboratory staff should be able to render their own
Continuous, dependable Oxygen Monitoring

The Bio-Tek Oxygen Monitor continually measures oxygen concentrations where critical oxygen levels must be maintained.

FEATURES:

- A disposable galvanic microfuel cell providing up to 12 months maintenance free use.
- Measuring range of 0–100% oxygen with 90% response time under 30 seconds.
- Adjustable alarm settings giving both audible and visual indications of incorrect oxygen concentration.
- 9 Volt battery, 100 hrs operation.
- 13mm high, 4 digit LCD display.

Additional C-1 respiration and C-2 anaesthesia microfuel cells are available ex-stock at very competitive prices.

Bibliography

2. Jazen, J. et al. Epidemiology of Hepatitis B surface antigen (HBsAg) and antibody to HBsAg in hospital personnel. J infect Dis 1978; 137: 261-5.
12. ibid p 19.
13. ibid p 55.
NEW PRODUCT NEW PRODUCT NEW PRODUCT NEW PRODUCT

INTRODUCING THE GREATEST TECHNOLOGICAL ADVANCE FOR THE BLOOD BANK IN OVER THIRTY YEARS!!!

ORTHOMONOCLONAL ANTI-HUMAN GLOBULIN

THE UNION OR RABBIT POLYCLONAL ANTI-IgG AND MOUSE MONOCLONAL ANTI-COMPLEMENT HAS BROUGHT THE BLOOD BANK TO THE 21st CENTURY WITH ORTHO AT THE LEADING EDGE

AVAILABLE:

CLEAR
100 x 10ml code 85063
15 x 10ml code 85052

GREEN
100 x 10ml code 85078
15 x 10ml code 85065

Ortho Diagnostic Systems
Telephone: 545-012

or Circle 136 on Readers Reply Card
Comparison of the Relative Specificities of Six Enzyme Immunosorbert Assays for HIV-1 Antibody Detection

Paul M. Austin M.Sc. (Hons) Research Officer, Ian W. Steed ANZIMLT Charge Technologist Research and Development Section, Diagnostic Serology Laboratory, Auckland Regional Blood Centre.

Abstract

The relative specificities of six commercial EIA anti-HIV-1 detection kits is outlined, based on screening of a blood donor population. The results demonstrate that a competitive type assay has superior specificity than any of its competitors.

Key words

specificity, EIA, HIV-1, Wellcozyme, HLA-DR4.

Introduction

From the first licensing of a commercial test kit for the detection of antibody to human immunodeficiency virus-1 (HIV-1) in 1985 by the United States Food and Drug Administration (FDA) a number of other manufacturers have developed products requiring evaluation.

The rationale behind the screening of blood donations for anti-HIV-1 is to detect HIV antibody positive donations and thus prevent transfusion Acquired Immune Deficiency Syndrome (AIDS) occurring. Sensitive screening methods must be used and these must also be technically easy to operate in view of the large numbers of samples that require testing. In addition the chosen method must show high specificity for anti-HIV-1.

Whilst the elimination of anti-HIV-1 from blood donations must remain as the primary objective, an equally important factor, especially in those geographical areas where there is a small donor base, is the unnecessary exclusion of blood from transfusion as a consequence of false positive results from screening tests.

This study compares the relative specificities of six commercial enzyme immunoassays (EIA) by screening a normal blood donor population for anti-HIV-1.

Materials and Methods

Sera

A total of 2203 randomly selected blood donor sera were obtained for anti-HIV-1 screening from the Auckland Regional Blood Centre. Not all kits could be tested using the same sera as kits were received at different time intervals. The numbers of sera tested by each kit is presented in Table 1.

Commercial assays

Six commercial enzyme immunoassays (EIA) for anti-HIV-1 detection were supplied by the following companies:

1. ELECTRONUCLEONS INC. (ENI) [Columbia, U.S.A.]
2. DU PONT [Wellington, U.S.A.]
3. CELLULAR PRODUCTS INC. [RETRO-TEK AAV] [Buffalo, U.S.A.]
4. GENETIC SYSTEMS CORP. [Seattle, U.S.A.]
5. WELLCOME LABORATORIES (WELLCOZYME) [Darford, U.K.]
6. BEHRING INSTITUTE (ENZYGNOST) [Marburg, West Germany].

All assays except the Wellcome Laboratories (WL), a competitive assay, were based upon the indirect "sandwich" principle of EIA. Of the six assays that were evaluated, the one supplied by Cellular Products Inc. (CPI) was undergoing development and as such was not intended for full scale blood screening.

With the exception of the kit supplied by Genetic Systems (G.S.), all assays were performed as per the manufacturers protocol. Halving of serum and diluent volumes for the G.S. method had no significant effect upon resultant absorbance values. This modification was used as it permitted a greater compatibility with laboratory organization.

The test kit supplied by Du Pont (D.P.), offered either a direct well addition, or a pre-dilution of serum. Direct well addition of serum was found to increase the number of false positives. Therefore, the data presented in this study was obtained using a pre-dilution of serum.

Screening of sera was carried out using each of the five commercial assays in parallel with the ENI supplied kit which had been previously adopted for routine use by the N.Z. Blood Transfusion Services. Sera that were initially seropositive, were re-tested in duplicate. If either of the duplicates returned a positive result the sera was subjected to a confirmatory test (Western Blot).

Results

The data presented in Table 1, illustrates that the WL assay achieved the highest specificity. Specificity is calculated as:

\[
\text{No. initially positive} \times \frac{100}{\text{No. tested}}
\]

Assays supplied by ENI and G.S. had almost identical specificities (99.6 and 99.7 percent respectively), followed by the CPI and D.P. assays. In terms of specificity the kit supplied by the Behring Institute (B.I) was inferior at 97.7 percent.

In terms of reproducibility of results, (determined by retesting initially antibody positive sera) the assay supplied by C.P.I. was superior (100 percent) followed by D.P., B.I., E.N.I., and G.S.

There existed no correlation between the positives scored by any assay in comparison with ENI. Unfortunately long delays in kit deliveries meant that all such sera were not able to be tested by all assays.

The ten sera that were repeatedly positive (four by B.I. and two each by ENI, D.P. and C.P.I.) were all negative by Western Blot analyses.

Table 1.

Determination of the specificities of six commercial enzyme immunoassays that detect antibody to HIV-1.

<table>
<thead>
<tr>
<th>Assay No.</th>
<th>No. Initial positive</th>
<th>No. Repeat positive</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENI (2203)</td>
<td>8 (0.36%)</td>
<td>2 (25%)</td>
<td>99.6</td>
</tr>
<tr>
<td>DU PONT (804)</td>
<td>4 (0.66%)</td>
<td>2 (50%)</td>
<td>99.3</td>
</tr>
<tr>
<td>CPI (327)</td>
<td>2 (0.61%)</td>
<td>2 (100%)</td>
<td>99.4</td>
</tr>
<tr>
<td>G SYSTEMS (327)</td>
<td>2 (0.61%)</td>
<td>2 (100%)</td>
<td>99.4</td>
</tr>
<tr>
<td>WELLCOZYME (503)</td>
<td>0 (0%)</td>
<td>N/A</td>
<td>100.0</td>
</tr>
<tr>
<td>BEHRING (442)</td>
<td>10 (2.3%)</td>
<td>4 (40%)</td>
<td>97.7</td>
</tr>
</tbody>
</table>

Numbers of sera tested by each assay is depicted beneath the assay name.

Discussion

Anti-HIV-1 assays designated for blood donor screening must be both sensitive and specific. If sensitivity studies are to be meaningful, the operator must have a panel of sera that includes patients at all stages of AIDS. A normal donor population will include very few high risk individuals as most of these will have been removed from donation by sell exclusion programmes. Thus, the only sensitivity work that a Blood Transfusion Service can undertake, will be dilution series of known Western Blot positive sera. Shortages of Western Blot positive sera together with transit delays of the anti-HIV-1 detection kit prevented a comparison of the sensitivities of the six EIA methods used in the present study. Although some assays may be able to detect antibody at higher titres than others, this may not necessarily correlate with detection of antibody at early stages of infection.

Our data shows good agreement with other evaluation studies of blood donor populations. In such a study1, the Genetic Systems assay had a specificity of 99.7 percent after testing 768 sera. Two independent studies 2, 3 gave the same specifications as the present study for the D.P. and WL assays. The only variation from published literature is for the B.I. assay, where our determination of specificity resulted in a much lower value (97.7 percent) compared to others 4, 5. This may be because the B.I. distributes ENI reagents under its own trademark. Early batches of ENI reagents, which differed from later
An Optimal Environment for Freezing and Preserving Vaccine, Human Plasma and Test Specimens.

KEMPHTORNE MEDICAL SUPPLIES LTD
P.O. Box 1234 Auckland Phone 775-289 Telex: NZ 2958 Facsimilie: (09) 778-652

or Circle 138 on Readers Reply Card
... provides a complete service for microbiologists

Culture media — dehydrated, and ready prepared

Susceptibility testing — media, discs, and the Oxoid Disc Dispenser

Selective microbiology — freeze-dried supplements for a range of specially formulated media

Anaerobic systems — anaerobic jar, a choice of atmospheres, and appropriate media

Distributed by ICI N.Z. Ltd.

Self Agents for OXOID Products.

or Circle 139 on Readers Reply Card
batches in terms of the specimen diluent and microplate composition gave a higher percentage of false positives. It was these early ENI reagents that the Behring Institute supplied to the laboratory for evaluation.

HLA class II antigens, especially DR 4, can cause false positive results in EIA assays. The DR 4 antigens are known to be present in a cell line (H9) which is used by ENI, BiL, D.P, and W.L. to propagate their HIV-1 isolates. The origin of the cell line used by C.P.I. could not be established. The assay supplied by G.S. uses a CEM cell line, for virus propagation which appears to lack any HLA class II antigens. In view of these facts it is not surprising that the Genetic Systems assay achieved the second highest percent specificity. It is possible that the high specificity demonstrated by the WL assay is due in part to a negation of the effect of HLA cross-reactivity by the competitive nature of the assay. Although to a lesser extent false positivity can be attributed to HLA antigen cross-reactivity, the different HIV-1 isolates used by the various commercial firms for microplate coating could account for the lack of correlation demonstrated by ENI and the other assays in scoring a sample positive for anti-HIV-1.

In conclusion, the present study evaluated the relative specificities of six commercial EIA methods for anti-HIV-1 detection. The method supplied by WL was the most specific. In decreased order of specificity were the kits supplied by ENI, GS, C.P.I. and D.P., with a range of only 0.4 percent between them. There was a further drop in specificity to the kit supplied by the Behring Institute.

For a blood screening assay to be an effective one, high specificity should be linked with high sensitivity. The Wellcozyme method appears to possess such sensitivity, and, the results of a recent study showed that it correctly identified as positive 163 immunoblot confirmed samples, and in the process was significantly more sensitive (P < 0.05) than five other commercial assays. Also, in the same study the method failed to score any samples positive from a panel made up of sera from 70 HLA DR 4 auto-immune patients, cancer patients, other viral diseases and from sera that had been stored/frozen.

This combination of high sensitivity and specificity, rapid assay performance time and competitive cost enabled Wellcome Laboratories to tender successfully for the supply of test kits for blood donor screening in New Zealand.

Acknowledgements

We would like to thank Dr. D.G. Woodfield for his valuable comments during the preparation of this manuscript. Also thanks to D. Chapman for performing the Western Blot test.

References


Medical Laboratory Technology Training in the Netherlands

R.W.L. Siebers ANZIMLT, Technical Officer, Department of Medicine, Wellington Clinical School, Wellington, and H.E.E. Benjamins, Charge Technologist, Laboratory Services, Regional Hospital, Middelburg, Netherlands.

A review of medical laboratory technology training in the Netherlands is presented here based on discussions held by R. Siebers on a recent trip to the Netherlands, with H. Benjamins who for many years was on the Executive of both the Dutch Association of Medical Technologists and the International Association of Medical Laboratory Technologists.

There exists at present two levels of education for laboratory personnel in the Netherlands: a higher professional level termed HBO ( Hoger Beroeps Onderwijs — higher professional education) and below that the MBO (Middelbaar Beroeps Onderwijs — technical vocational education). Entry to either stream (or to university) depends mainly on the secondary schooling education received and is presented in figure 1. The HBO Institutions (comparable to the NZ Technical Institutes) prepare students after their secondary schooling for the applied arts and sciences. There are more than 400 such institutions with approximately 200,000 students compared to 13 Universities with approximately 150,000 students in the Netherlands.

At present these HBO Institutions are being re-organised into 45 large-scale Institutions; and of about 20 such Institutions at present with a laboratory technology department the re-organisation will most likely limit the study of laboratory technology to about 10 Institutions in the future. The HBO and MBO programmes are currently offered by the same Institutions and as a result of the intended changes mentioned above, the HBO and MBO programmes will be separated according to the restructured HBO and MBO Institutions. For laboratory education at these Institutions the HBO and MBO programmes are renamed the HLO (Higher Laboratory Education) and MLO (General Laboratory Education) and as such will be referred to in the rest of this report.

The first year of study in the Laboratory Technology Institutions for either level is a general one mainly covering the topics of chemistry-physics and mathematics. Being a selection year drop-out usually takes place at the end of this first year. For the next two years successful first year students select the option of further laboratory technology training in either the medical, chemical or botanical field. For the HLO Medical Laboratory Technology option students either specialise in clinical chemistry (including haematology), microbiology or cyto-histopathology. The Institutions are more or less free in the choice of their training programmes and Table 1 gives a rough estimation of the hours spent teaching (both theoretical and practical) in each subject. There is a council for higher professional education which tries to coordinate the Institutions' programmes, and this Council's Laboratory Committee is restructuring the laboratory education at present. However, this Committee's advice to the Education Department is not necessarily followed.

At the end of the third year exams are set, supervision of which is provided by members of the academic staff at each Institution's Laboratory Department. During the fourth (and final) year HLO students enter the hospital laboratory for the first time for practical laboratory experience where they are further trained in routine and some more complex procedures and observe management and daily routines of a hospital laboratory. After six months of this they do a specific project on which they write a treatise and present this project orally before their tutors. Thus, at the end of four years of training they qualify and then apply for advertised positions throughout the country in their particular speciality.

Over the last few years several HLO qualified technologists were unemployed or employed in other than hospital based laboratories; however, it is predicted that unemployment amongst HLO technologists will rapidly diminish in the near future. The lower MLO qualified technologists are less fortunate. Many of them cannot find suitable hospital laboratory jobs or are employed outside of hospital laboratories.

The Dutch Government would like them to have hospital laboratory positions but Heads of hospital laboratories prefer to limit their staff to no more than about 20% comprised of MLO technologists. The Dutch Association of Medical Technologists, which includes both HLO and MLO trained members, is encouraging the Institutions to reduce their intake of MLO students. Currently about 400 students complete the HLO Course each year and for the MLO Course this number is about 420. It is possible for MLO trained technologists to do the HLO Course but it will take them another four years and failure rates for these students of up to 50% are not uncommon. There used to be a class of laboratory assistants in the past who were entirely "in-house" trained but this has been abolished and hospital laboratories nowadays are totally staffed by qualified medical laboratory technologists mainly with an HLO qualification. This HLO qualification is essential for medical technologists wishing to attain charge technologist or Section Head positions.

<table>
<thead>
<tr>
<th>Subject</th>
<th>HLO Hours</th>
<th>MLO Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Chemistry</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Microbiology</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Haematology</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Histology</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Cytology</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Immunology</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Dutch</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>English</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Mathematics</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Statistics</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Computer Sciences</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Inorganic Chemistry</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Analytical Chemistry</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Biology</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Physics</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Physical Chemistry</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Electronics</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Instrument Techn</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Lab Safety</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Cell Biology</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Anatomy</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Physiology</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Other subjects</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1

Hours (approx) of teaching in each subject

---

Figure 1

Education System Structure

The Dutch Association of Medical Technologists comprises a
Announcing
the Wellcome

International
Travel Award
Kobe, Japan

Applications and nominations are
invited from all members of the
NZIMLT for this prestigious award.
The Award sends our winner to the
exciting city of Kobe, venue for the
18th Congress of the IAML.

This is the most significant award the Institute
presents and rewards individual effort in
support of the profession. As recipient of this
year's award you will attend the 18th Congress
of the IAML in Kobe, Japan, during July
17th-22nd 1988. The award provides you with
Congress fees, return airfare, plus a daily
accommodation allowance.

All Fellows, Associates and Members of the
NZIMLT are eligible to apply or be
nominated. If you believe a colleague deserves
this award, then we recommend you complete
the Application Form as their nominator.

Current office bearers of the IAML or
employees of Wellcome New Zealand Limited
cannot apply.

Applications will be judged on your
professional and academic abilities together
with your active participation in promoting
Medical Laboratory Technology.

Applications/Nominations must be on the
official form and received by the Secretary,
NZIMLT no later than 5pm, 30th June 1987.
Late applications or nominations will not be
accepted.
The decision as ratified by the council of the
NZIMLT will be final.

CLOSING
DATE
JUNE 30th
1987
APPLICATION & NOMINATION FORM
WELLCOME INTERNATIONAL TRAVEL AWARD

APPLICATION | NOMINATION

(Date: ________________________)

NAME: ________________________________________
(Applicant's name or person being nominated)

AGE: ________________________________________

ADDRESS: ________________________________________

AWARDS RECEIVED: ________________________________________

PROFESSIONAL EXPERIENCE (Positions held):

PAPERS PUBLISHED OR PARTICIPATION IN RESEARCH:

DO YOU INTEND TO SUBMIT A PAPER FOR PRESENTATION AT THE CONGRESS?

IF YES, ON WHAT SUBJECT?

ADDITIONAL APPLICATION FORMS CAN BE
I wish to apply for this Wellcome International Travel Award for the following reasons: (In less than 200 words)

I agree to abide by the terms of the Award and the decision of the judges.

SIGNED: Nominee Applicant (Delete as appropriate) DATE:

This application form must be accompanied by references from;
(a) The Director or Senior Medical Officer in charge of your laboratory.
(b) Any other unrelated individual.

APPLICATIONS MUST BE RECEIVED NO LATER THAN 5 P.M. ON 30 JUNE 1987 POST TO:

NZIMLT SECRETARY, HAEMATOLOGY DEPARTMENT, CHRISTCHURCH HOSPITAL.
Council of elected members from 11 divisions which is similar in structure to the New Zealand Institute. They also have a permanent secretariat and a Journal Committee which produces the Dutch Association’s monthly Journal named “Analyse” the Journal for medical technologists. The majority of articles published (totally in Dutch nowadays) are of a review nature of topical subjects generally, written by medical specialists or University trained clinical biochemists and occasionally by medical technologists. Association matters, advertisements and job positions comprise the rest of the Journal contents. About 60% of qualified technologists (both HLO and MLO) belong to the Association, and membership also consists of special, interested, donating and honorary members and students.

1986 Eli Lilly Award


Murray Carter

Microbiology Department, Taranaki Base Hospital, New Plymouth.

This year’s Congress attracted more than 500 delegates, with the majority coming from Australia (440) and New Zealand (70). There were also small numbers of delegates from most of the South Pacific islands, such as Tonga, Samoa, Vanuatu and Fiji.

The Congress itself was preceded by an Education Day. The object of the education day was to give delegates an opportunity to learn of the various changes that have taken place over the past decade, and to hear of some of the recent innovations in concepts and techniques for each of the specialities in medical laboratory science. The fields covered were: Microbiology, Biochemistry, Haematology, Immunology, Endocrinology, Cytology and Virology.

The speakers were all well recognised experts and in general succeeded in presenting what were often complex issues (DNA probes, Monoclonal antibodies, Cell markers) in such a manner that the non-specialist was able to understand and appreciate the information. I attended the following sessions of the Congress.

Applications of DNA Probe Technology in Microbiology

The speakers in this symposium focused their attention on the use of DNA probes in detecting specific pathogens (both bacterial and viral) in clinical specimens, the detection of virulence factors in bacteria (Enterotoxin production in E. coli), and the value of probes in identification of micro-organisms recovered from clinical specimens by standard methods. The techniques of using DNA probes are now emerging from the reference laboratory environment and within the next few years will become routine in the diagnostic microbiology laboratory. They will allow more rapid detection of a wide variety of pathogens, the early institution of specific treatment, a reduction in demand on laboratory services, and shorter hospital stay for many patients.

Serological Diagnosis of Infectious Diseases

Topics covered were the detection of Toxoplasma specific IgM antibody using an IgM capture assay, the diagnosis of postnatally acquired Rubella, a comparison of methods for Rubella antibody screening, and the serological diagnosis of Bordetella pertussis infection in adults.

I was particularly interested in the paper on B. pertussis infections in adults. The organism can be isolated from only about 50% of cases occurring in children, with rates as low as 10% in infected adults. This group of workers using an ELISA method, were able to demonstrate that serum IgA response occurs in B. pertussis infections but not following vaccination. Testing in serum of 214 adults with persisting cough (1 month or more) demonstrated significant IgA antibody in 23%, thus establishing B. pertussis as an important cause of prolonged cough in adults. The test enables a rapid diagnosis of whooping cough to be made, the system being highly sensitive and specific.

Reporting Dilemmas

The age old problem of microbiologists! The bacterial flora of the female genital tract, the gastrointestinal tract and the skin were discussed. The resident and transient microbiota (normal flora) which are regularly present may be altered by physiological, pathological, or environmental factors. In some circumstances the normal flora may be causative infection and so the decision has to be made whether to assign clinical significance to an isolate. This requires a knowledge of the body’s indigenous bacterial flora, the ability of an organism to invade the body, calculation of the probability that an organism is colonising a site without causing infection, and so on.

Rapid Identification Techniques for Bacteria

The papers reviewed most recent techniques which have been developed for rapidly identifying bacteria in the laboratory. There has been a re-evaluation of latex agglutination technology and recognition of its accuracy, simplicity, and economy. This has led to the marketing of a wide range of latex tests which have many applications in the routine diagnostic microbiology laboratory.

Iatrogenic Illness

Iatrogenic illness is physician induced disease. This is normally not to assign clinical significance to an isolate. This requires a knowledge of the body’s indigenous bacterial flora, the ability of an organism to invade the body, calculation of the probability that an organism is colonising a site without causing infection, and so on.

ELI LILLY MICROBIOLOGY SCHOLARSHIP

This award, consisting of $500 kindly donated by Lilly Industries (NZ) Ltd, is to be used either for the purpose of funding a research project which cannot otherwise be undertaken or to attend an overseas scientific meeting. The scholarship is open to all financial members of the NZIMLT currently working in the field of Microbiology. Applicants for the Scholarship must apply on the official application form available from the Secretary of the NZIMLT.

Acceptance of the Scholarship will require the recipient either to prepare an article for publication in the NZIMLT journal relating to that research or prepare a full report on the meeting attended for publication in the NZIMLT journal.

Applications close on 1 July 1987 with the Secretary, NZIMLT, Haematology Dept, Christchurch Hospital, Christchurch. The successful applicant will be announced at the Annual Scientific Meeting.
interpreted as disorders that result from diagnostic or therapeutic interventions.
Iatrogenesis is a widely recognised and accepted consequence of certain treatment regimes — cytotoxic drug therapy for malignant disease, but it is rarely considered that it may result from the incorrect utilisation or interpretation of laboratory investigations, or as a result of errors which may occur in the collection or processing of laboratory data. This session provided timely reminders that laboratory workers have responsibilities in ensuring that accurate and relevant results are given to the clinician.

The other aspect of iatrogenic illness that was examined was the causative role of therapeutic drugs and how the laboratory can provide a very useful function in the prevention of many of the side effects of drug therapy by being able to monitor the serum levels. Thus, toxic levels (and sub-therapeutic levels) can be detected.

Sexually Transmitted Diseases
Topics covered included a review of recent advances in the diagnosis of Herpes simplex infections, a protocol for screening hospital and sexually transmitted disease patients (VD Clinic) for syphilis, and the results of a survey carried out in Australia to determine the incidence of penicillinase producing *Neisseria gonorrhoeae* (PPNG). The incidence of PPNG in New Zealand is still quite low and it would appear that the organism is not yet endemic here as it is in Australia.

Acquired Immune Deficiency Disease (AIDS)
Speakers at this session discussed the clinical and therapeutic aspects, the diagnosis of AIDS, and reviewed AIDS in New South Wales. Much of the material was well known. However, the implications for the health system of large numbers of AIDS patients presenting for diagnosis and treatment in the years to come, are extremely serious.

A varied social programme was organised, including a welcome reception held at the Sydney Opera House, for all delegates, restaurant dining, the Congress Dinner, and optional Sydney and Harbour Tours. This gave delegates an opportunity to renew old acquaintances, cement new friendships and exchange ideas and points of view in an informal setting.

I would like to acknowledge the assistance of Eli Lilly (NZ) Ltd in assisting me to attend this Congress.

---

**LETTERS TO THE EDITOR**

Dear Sir,

re: The Inexpensive Enzyme Linked Immunosorbent Assay for the Detection of Hepatitis B Surface Antigen

We have found that rapid method's* sensitivity is influenced in particular by the age of the conjugate, and, to a lesser extent the age of the coated microplate. To offset this problem, we designated two bottles of conjugate (one for each incubation protocol) and, as the 'rapid conjugate' began to lose its sensitivity (as detected by quality control graphs) it was transferred to the 'overnight conjugate' bottle, and fresh conjugate was prepared.

Another interesting finding was that the type of diluent used (Enzygnost supplied anti-HBs negative control or pooled normal human serum (NHS) negative for HBsAg/anti-HBs by EIA) to dilute the Enzygnost supplied positive control had a significant effect. P<0.001 upon optical density (O.D.) values. It was determined that some factor (probably very low levels of anti-HBs) in the pooled NHS as opposed to a higher background signal caused a depressive effect upon O.D. readings.

We hope that these findings will prove useful to laboratories utilising this method of screening for HBsAg.

Yours sincerely

P.M. Austin MSc(hons)
Research Officer
Diagnostic Serology Laboratory
Auckland Regional Blood Centre

Reference:
1. Steed, I.W., Anderson, R.A.M., Austin, P.M. An Inexpensive Enzyme

---

**FIJI MEDICAL LABORATORY TECHNOLOGISTS ASSOCIATION**

**ANNUAL CONFERENCE**

**28th — 30th AUGUST 1987**

**THEME: THE LABORATORY IN CLINICAL MEDICINE**

Linked Immunosorbent Assay for the Detection of Hepatitis B Surface Antigen.


Dear Sir,

Re: Fiji Medical Laboratory Technologists Conference

We write to inform you that the Annual Conference for Fiji Medical Laboratory Technologists Association is scheduled to be held from 28th-30th August, 1987, with the venue yet to be confirmed.

We have conducted seminars regularly over the last few years and have found them to be quite successful. Discussions on topics of interest and presentation of papers in the field of paramedical technology has contributed significantly to the growth and development of laboratory technology in Fiji.

The theme of this year's seminar will be "Laboratory in Clinical Medicine". Quite like the previous years we are expecting continued support from overseas organisations like yours in way of papers and discussions in areas relating to the theme of this seminar.

We cordially invite you and members of your organisation to participate in the seminar. May we also regretably add that for your participation our association is not in a position to offer any financial assistance.

We await your response with keen interest

Yours sincerely

Mrs Sarojini Krishna
Secretary, Seminar Organising Committee

---

**A Step Forward?**

Dear Sir,

Quotable quote from a recently typed report on monitoring oxygen levels in babies.

"The unit has a new machine for doing blood guesses.\(^{1}\) Sounds useful!\(^{2}\)

Yours faithfully

Andrea Ramirez
Immunohaematologist

---

**Canterbury Hospital Board**

**Pathology Services 75th Anniversary**

A reunion of current and former staff is being held in Christchurch on Friday 3 July and Saturday 4 July, 1987, to mark the 75th Anniversary of Pathology Services in the Canterbury Hospital Board.

Former staff are urged to attend. A programme and registration details are available from Barrie Edwards, Pathology Services, Christchurch Hospital, Private Bag, Christchurch.

---

*Editor's note: *The unit has a new machine for doing blood guesses refers to the multiparameter analyser, which has been a significant development in the monitoring of oxygen levels in babies.
The Pacific Way has in past editions of the N.Z.I.M.L.T. Journal outlined the work in the Pacific of organisations such as Volunteer Service Abroad (V.S.A.) and The Red Cross. The Leprosy Trust Board has been providing assistance to the Pacific area since the 1930's and it would seem appropriate to outline the work of this organisation in a similar way.

The Leprosy Trust Board of New Zealand exists to continue the work laid down by the late Patrick Twomey. It devotes its energies to soliciting contributions within New Zealand which, in turn, are used in helping towards the eradication of leprosy in the Pacific Islands, the rehabilitation of sufferers, and the continuation of the vital research work being carried on in New Zealand. During its existence the Trust Board has allocated more than $9.25 million in its fight to control and eventually eradicate leprosy in the South Pacific region. Although many improvements have been made in the control and treatment of leprosy, there are still approximately 4,000 patients in the South Pacific and about 60 patients in New Zealand alone.

Multi Drug Therapy (MDT) is the most recently developed method of treating leprosy. It is a relatively expensive, but effective programme - the costs of both the drugs themselves, and getting them to the patients, are high. It is essential that this programme be supervised, as each patient receives regular injections and assessments requiring a great deal of travelling for medical staff.

The work of the Leprosy Trust Board (L.T.B.) is now centred on this new M.D.T. programme and the educational process needed to counteract the stigma of leprosy. As a small but significant part of this educational programme, the L.T.B. assists, by way of sponsorships, many V.S.A. workers concerned with anything connected with health and leprosy in particular. The Board pays 75% of the air fares for New Zealand medical students who wish to go to Vanuatu to further their medical studies. Leprosy is a disease requiring knowledge which can only be gained by clinical work with the patients. The hope is that New Zealand doctors will gain at least some of this knowledge by undertaking a stint in the Pacific area.

Current research work at the Auckland Medical School is aimed at producing an effective vaccine against leprosy. In most people the immune system functions to prevent the growth of Mycobacterium leprae the organism causing leprosy. But for people in whom this control does not function, the important problem is to learn how to persuade the immune system to provide protection. With the help of funding from the Leprosy Trust Board and other organisations, scientists led by Professor James Watson at the Immunobiology Department of Auckland University Medical School, are carrying out a research programme directed towards understanding the immune response to M. leprae. Professor Watson considers his unit fortunate to be associated with the Leprosy Trust Board who are prepared to provide funds for research. Most organisations working in the field of leprosy expend funds on drug programmes, social and rehabilitation needs, nursing etc., but very little is expended on basic research to producing a vaccine. If other voluntary organisations working in the field of leprosy, directed more finance to the problem of "getting rid of the disease rather than just alleviating the problem" the production of a reliable 100% one shot vaccine for leprosy sufferers would proceed at a faster rate. The Unit has developed close relationships with other laboratories working in the M. leprae field. Professor Watson says "We seem to have become part of a network of laboratories, one in Boston, the laboratory at Cavill, Louisiana, the laboratory at Mill Hill and the Institute of Tropical Hygiene in London and a laboratory in Sydney. They are all working in the leprosy field, albeit in slightly different areas.

All the skills and expertise we develop are freely circulated amongst these laboratories — as are their findings referred to us. No laboratory by itself has the "person power" or the resources needed without such co-operation and co-ordination of work. This same network of
laboratories also exists among those trying to find vaccines etc., for other diseases such as cancer, malaria and so on.

It is practically impossible for any one laboratory to produce successful results of any research without calling on the resources of other laboratories and their technical staff.

In addition to the M.D.T. programme and Professor Watson's research programme the nature and extent of the Board's work is best illustrated by the following list of where some allocations have been made. The list is by no means complete.

CHURCH MEDICAL MISSIONS

ANGLICAN — Church of Melanesia Trust Board, Honiara, Solomon Islands, for medical work, mainly at the Hospital of the Epiphany, Malaita, St. Clare's Hospital, Taroaaina and Loloiai, Vanuatu.

CATHOLIC — Marist and Dominican Mission medical work on Bougainville, Solomon Islands, and Vanuatu.

UNITED CHURCH — Medical work Helena Goldie Hospital, Munda, Solomon Islands.

SEVENTH DAY ADVENTIST CHURCH — Medical work mainly at Atofi, Malaita, Solomon Islands.

SOUTH SEA EVANGELICAL CHURCH — Medical work at Natuna.

GOVERNMENT MEDICAL DEPARTMENTS:

WESTERN SAMOA LEPROSY TRUST BOARD: The L.T.B. Samoa has an interest in a self-help boat building project which has helped a number of former patients. Currently assistance is being given with the introduction of multi drug therapy.

TONGAN LEPROSY PATIENTS' TRUST COMMITTEE: This ecumenical committee presently chaired by the Anglican Bishop, with members drawn from all churches in Tonga together with representatives of the Government Health Services, promotes the health and well-being of leprosy sufferers in the country. Funds from the Board are used by the committee to help overcome the housing problems of leprosy victims and, using voluntary labour, many substantial houses with modern washing and toilet facilities have been built. A four-wheel-drive vehicle also figures prominently in the grant to Tonga.

TUVALU AND KIRIBATI: Efforts are being hindered by the nature of the countries with their scattered islands and by their virtual isolation, as well as uncertain links with the rest of the Pacific. Lack of technicians results in poor maintenance of hospital equipment and, on two recent occasions, lack of aircraft has prevented visits. A comprehensive leprosy programme is needed in these countries.

TAHITI: The grant is administered by a local committee and the Chief of Public Health. Items not readily provided by the Government, comforts for leprosy patients, spectacles and so on, are covered by the grant.

NEW CALEDONIA: An active committee has been responsible for funds here for a long time. It provides recreational halls, cinemas and other entertainments for patients. More recently it has provided grants for discharged patients experiencing difficulties in finding homes.

NIUE: The grant in Niue cares for some impetuous former patients. It provides a family with groceries for a year and the fund is administered by the Department of Health.

SOLOMON ISLANDS: The grant covers new clinics. finance for renovations to existing clinics and various forms of transport. It also covers wages of leprosy fieldworkers on Malaita and Guadalcanal. A pilot multi drug therapy programme at Minu, Guadalcanal, is in progress.

VANUATU: The grant covers items similar to those provided for the Solomon Islands.

FIJI: The Leprosy Trust Board (Fiji) Inc. administers the grants made to Fiji. Such items as footwear for the Twomey Hospital shoe shop, financial support for the occupational therapy tutor, laboratory wages and supplies, extra clerical assistance for the hospital, replacement transport cost, money for extra clothing for patients, modest rehabilitation allowances for patients and families of patients since discharged.

History of the Leper Man Appeal

The Appeal had its beginnings for the 25 leprosy patients isolated on Quail Island in Lyttleton Harbour during the 1920's. Mr Benjamin Pratt, who worked for the Gas Company in Christchurch, had started an appeal for Christmas comforts and other needs for the patients. He interested members of the public in assisting with visits of singing groups, church groups and other diversions, as well as providing material comforts. Prior to Mr Pratt commencing his appeal, Mr Patrick Joseph Twomey had joined an Order of his church which sent him to Fiji to teach. In the early 1920's Mr Twomey came in touch with many leprosy sufferers, who, in those days, were indeed revolving sights as little could be done for them beyond 'tender loving care' and the use of Chaulmoogra oil. This oil was a reasonable efficacious treatment but very painful. It had to be injected under hospital conditions which had earlier required the establishment of the Central Lepers Hospital on the island of Makogai, some 80 miles from the main Fiji Island of Viti Levu. Pat Twomey befriended several patients and tried to do what he could for them. The tropics were never kind to Pat who was prone to rheumatism and became ill to such an extent that he was invalided back to New Zealand. He eventually resigned from the Order and took up various employment, finishing up as a meter reader and clerk with the Gas Company in Christchurch. While there, he met Mr Benjamin Pratt. With their common interest in leprosy sufferers they joined forces in the work for the patients in Quail Island.

In 1925 Quail Island was closed as a leprosarium and the remaining patients were transferred to Makogai where they joined a much larger family of approximately 750 leprosy sufferers from around the South Pacific. It was obvious that if anything worthwhile was to be done for this much larger family, then the Appeal efforts in New Zealand had to be developed well beyond the minor needs of the Quail Island situation.

Prior to his death in 1930, Mr Pratt asked Mr Twomey if he would take over the entire Appeal. Patrick Twomey threw himself into the task with zeal and real dedication. It was not long before he was widely known as 'The Leper Man'. The Appeal returns developed to such an extent that by 1939 several thousand dollars were coming in and it was deemed wise to form a Trust Board. The first Board was formed in September 1933. The Leprosy Trust Board with responsibilities extending to the whole of the South Pacific, was set up in 1942.

MERCIA ROTASCREEN

Latex Test For Rotavirus:
- Rapid 10 minute test
- High sensitivity
- High specificity
- Proven performance

EIA Test For Rotavirus:
- New method
- 96 test kit
- Strip format EIA plates
- More sensitive than Rotascreen latex

NOW A ROTASCREEN KIT FOR ALL OCCASIONS

Distributed By:
MED-BIO ENTERPRISES LTD.
P O Box 33-135 P O Box 13-595
Christchurch Auckland
Ph (03) 381-020 Ph (09) 655-912

or Circle 137 on Readers Reply Card
A New Zealand Technologist in Peru
W.L. Johns, ANZIMLTT

Since May 1986 I have been working with the Aguaruna and Huambisas Council, a jungle Indian group in the Upland Rain Forest of Northern Peru.

The 35,000 Aguarunas and Huambisas are part of the Jivaro Group, who were head hunters (as head hunters they recognised) only Jivaro heads worth taking and shrinking, they repelled two Inca invasions and were locked into intermenian feuds until the 1960's.

The Aguaruna and Huambisa Council (Consejo) was founded in 1977 and gradually obtained through the Government, land titles to all the Indian communities. The Council is composed of delegates representing the Indian communities living on the banks of the rivers: Maranon, Chiriaco, Conesa, Nieva and Santiago. They have developed their own projects, and have given the highest priority to the development of a Primary Health Programme.

In the late 1970's one of the Aguarunas began to use a microscope to improve diagnostic ability, 'Brujeria' a complex system of witchcraft is an integral part of everyday life. The jungle Indians saw something almost magical about the use of the microscope, the careful 'ritual' of preparing the specimens and at the end, they could see the actual body of the person, moving things that caused disease.

They decided they would have a small laboratory at each Health Centre and in 1983 their own people attended a training course at the Lima Hospital for Tropical Diseases. I am on a two year contract with the Catholic Institute for International Relations (a member of the British Volunteer Programme, which sends volunteers to parts of Latin America, Africa, and the Middle East). Once I had settled in at Napuruka, the centre of the Councils activities, I set out, over the following six months, to visit each of the five laboratories.

The work of the laboratoristas (as they are called in the jungle) helps the health promoters to diagnose and treat patients. We use techniques that are simple and low cost and our range of tests is small: blood smears to diagnose malaria, microscope examination of stool samples for parasites, the staining of sputum specimens for T.B., urinalysis and the detection of anaemia by doing a haemoglobin test.

Because the travelling distances are so large, two or three days from one end of the zone to the other, we have started a system enabling us to take the laboratories to the people. What was essential for our 'mobile lab' was a box suitable to carry safely our microscope slides, stain and reagent bottles. In September, during a two week training course the technicians assembled their own mobile lab boxes. They started with a strong plastic beer box; it would not rot in the high humidity of the jungle. The divisions inside were ideal for stain bottles. Plywood was used for the base and lid. Rather than use steel hinges that would soon rust, we used strips of car tyres.

We take as part of our canoe cargo, a microscope in a carrying case. A steel bucket is used to carry a hand operated centrifuge, test tube rack and staining rack. These community visits are done with the river supervisors. Our mobile laboratory service is a kind of 'traveling circus'. Our temporary lab may be located in the communities school, outside the health post, or in a building used for meetings.

In the afternoons, using a small portable water testing kit (Del Agua) we do water testing. Next morning the results are given to the community's Health Promoter. Water testing and the protection of springs will become a vital part of the Council's health programme for prevention.

Once on the river we are subject to changes in the weather. In the morning there may be a mystical mood to the river, with mist leaving only the faintest outline of the riverbank on the other side. A few hours of brilliant sunshine may follow then by midday heavy rain has set in. On these journeys all the while we pass the endless thick rain forest. There are birds to look at like bright red headed kingfishers. Butterflies rest on the banks, waving their yellow and luminous blue wings.

My travels by canoe about the zone, visiting each of the five Health Centres and giving a refresher course to the laboratoristas gradually allowed me to build up a picture of their health programme. Yet it wasn't until I attended my first health meeting of the Santarios (primary health workers) that I clearly understood how the Council's programme worked.

Laboratoristas using the New Zealand made DELPHI Haemoglobinometer during the refresher course September '86.

The four day assembly of the Santarios began with the election of officials, chairman and secretary. In front of me about 80 of the 120 Santarios, the women including the recently trained Santarisa (women health workers) occupied the front three rows.

Each of the five supervisors, one for each river, got up and gave the report about their sector. Following this was a report by the supervisor of the womans programme and that of the director of the whole programme. As advisers, one of the doctors, then myself gave our reports. The reports over, everyone had an opportunity to join in the lively and sometimes lengthy debates: "Fuel not always available, could a laboratorista take day off? Was it the Communities or the whole health programmes responsibility to find money to repair the kerosine refrigerators?" With the debating at an end, voting took place.

Those in the front row that had dozed off in the afternoon sun, woke started at all the talk about snakes. The Council's newly built Serpentarium will crystallize the venom and send it overseas. This is part of the Council's plan to help the Health Programme to be self financing. The director of this part of the programme wrote up on the blackboard the prices he was willing to pay, in allowing them to stock the Serpentarium. Prices ranged from 03 = US$12 = NZ$24 to 26 = US$42 = NZ$84 for the more valuable snakes.

Our presence at such meetings is to encourage participation, to suggest options for discussions — in short our role is to act as a catalyst. I was left in no doubt of the considerable organizational ability of the Aguarunas and Huambisas and their natural ability to improve their own self development project. The same organizational potential was used in the past for emergency mobilization or fusion of Antagonistic leading units or when the Aguarunas in 1979 achieved international prominence when they ejected the German film maker Werner Herzog from Indian territory, during the filming of " Fitzcarraldo".

Buying equipment and supplies in Peru is time consuming and frustrating. Three laboratory suppliers in Lima were presented with a list of lab items. Weeks passed and our replies started to trickle in.

One of the laboratories at the Nieva Health Centre.
they managed to supply 44 items. A good, low cost microscope suitable for the jungle was not available. They simply didn’t know about: polypropylene non breakable test tubes, filarias filtration kits, and a battery operated haemoglobin meter. We couldn’t buy stains like: Fields & Giemsa. In nearly every case when an item could be prepared they were far more expensive than U.K. prices; microscope slides were about four times more expensive, and pasteur pipettes 12 times more expensive.

We did try to use our Peruvian money to buy lab equipment overseas but soon we were entangled in an impenetrable thicket of red tape. Complicated exchange regulations and import regulations made it very difficult to buy overseas.

Once a routine is established, with the help of the laboratory technicians the mobile labs plan to carry out a survey that would give the health programme a better idea of the state of health. They would have their own information about the incidence of anaemia and parasites throughout the area and use this information to bring about changes and improvements to the health programme.

The Aguaruna and Huambisa Council’s Health Programme is one of the few primary health programmes to have their own laboratorists. We are then, part of an experiment in using laboratories at the “grass roots” level. Our water testing kit and battery powered haemoglobin meters are very much part of this experiment. Modern equipment is chosen for its reliability, robustness, sensitivity, low cost and simplicity in execution. The new knowledge and equipment is not an end in itself but meant to help defend and serve the traditional culture.

North of the Bombay Hills: What’s Happening in Haematology

A news column by the Auckland Haematology Charge Technologists Group. Many of the matters considered by this group, have interest beyond the Auckland area and we propose to present in this and subsequent issues of the Journal, a regular section concerning our activities. We welcome feedback. If you have comment or require further information, contact the sub-committee convener whose name appears below each item. Contributions to the section B. Laboratory Services committee has also co-opted the help of at least 15 other people, both technical and medical to advise in specialist fields. Thus ensuring the widest possible informed comment.

The syllabus is divided into four major sections:

Section A. General Laboratory Practice.
Section B. Laboratory Procedures.
Section C. Haemopoietic System (theory), (This section was prepared by Robin Allen, Waikato Hospital).
Section D. Clinical and Laboratory Haematology.

Currently the four sections of the syllabi are virtually complete, Section A, B and C are keyed into a word processor and Section D awaits final typing and a limited circulation in the Auckland area for comment. It is hoped that the entire document will be completed by the end of April, when it will be distributed to centres throughout New Zealand for comment before the final draft is presented to the June meeting of the Medical Laboratory Technologists Board for approval, for implementation in 1988.

The Syllabus Review Sub-Committee realises that it is impossible to prepare a document that all users will be satisfied with. The information available and the rapid technological changes involved in medical technology have made the committee very aware that a document of this nature should be compiled in conjunction with those having the appropriate educational skills to do so. Consideration will have to be given to this point in the preparation of future syllabi.

Marilyn Eales
Middlemore Hospital

Standardisation

About 18 months ago the Haematology Charge Technologists Group embarked on a project to standardise Haematology nomenclature and reporting in the Auckland area. The aim of the project is to provide a standard nomenclature for blood cells and expression of results that can be used in Haematology laboratories. Terminology has been chosen with a preference for simple, widely understood words and with reference to current literature.

The advantages of a standardised reporting system are seen as:

Warren Johns and the five laboratoristas on a retraining course September '86.

These agents simply couldn’t supply us — out of 111 items on our list
1. Consistency of reporting where tests from a single patient may be processed on different sites.
2. Medical staff on rotation are not faced with differing terms and quantitation.
3. Persons reporting use terms and quantitations that are clearly defined.
4. Tutors can use a standard (commonly understood) terminology.

To date the general Haematology and red cell sections of the standardisation document have been completed and are currently on a six month trial in both Hospital and Private Laboratories. The white cell and platelet sections are nearly complete and should be ready for trial towards the end of April. At the completion of each trial the experience of the participating laboratories will be reviewed and recommendations are made for purchase. Individual departments are encouraged to consider a single supplier for each item.

Advice is given with regard to quality, supply and acceptability of laboratory supplies held at the A.H.B. Central Store. Complaints arising from tenders and Central Store stock are notified through the convener to group members. An investigation protocol is followed to provide essential information for follow-up action, which is then taken by the convener.

Investigation Registers
The Departments of Haematology record evaluations of new and existing procedures, products and instrumentation, using standardised evaluation protocols. Summaries of these protocols are held in the following areas:
1. General Haematology — North Shore Hospital, held by David Underwood.
2. Haemostasis — Auckland Hospital, held by Alan Johns.

An annual update disseminates the information and saves duplicate investigations as well as ensuring adequate protocols are followed.

David Underwood
North Shore Hospital

Education
As Haematology Tutor I find it of great benefit to be included as a member of the Haematology Charge Technologists Group. Information and problems which are discussed within this forum may directly relate to my involvement with the education and training of laboratory students.

Attempts to resolve difficulties are enhanced by the co-operative nature of the Group where the commitment of the students to their education and their service time is recognised and supported.

I am able to provide a suitable link for the H.C.T. to the external institutions involved with education and examinations, The Medical Laboratory Technologists Board, Auckland Technical Institute and the N.Z.I.M.L.T, who communicate with the Auckland School of Medical Laboratory Technology.

Ann Watson
Haematology Tutor
A.S.M.L.T.
INSTITUTE BUSINESS
Office-Bearers of the N.Z.I.M.L.T. 1986-87

President
C. Campbell
Laboratory, Palmerston North Hospital

Vice-Presidents
W. J. Wilson
D. Dixon-Mclver

Secretary
B. T. Edwards
Haematology, Christchurch Hospital

Treasurer
D. M. Reilly
Diagnostic Laboratory, Auckland

Council
M. Young, D. Pees, J. Elliot, J. Parker, P. McLeod

Editor
D. Dixon-Mclver
Biochemistry Dept., National Women’s Hospital, Auckland, or the Editor, P.O. Box 35-276, Auckland, 10.

Membership Convenor
David Pees
P.O. Box 29-115, Greenwoods Cnr, Auckland.

Membership Fees and Enquiries
Membership fees for the year beginning April 1, 1987 are:
For Fellows — $55 Sub $5.50 GST
For Associates — $56.00 Sub $5.50 GST
For Members — $40 Sub $4.00 GST
For Non-practising Members — $30 Sub $3.00 GST

All membership fees, changes of address or particulars, applications for membership or changes in status should be sent to the Membership Convenor at the address given above.

Members wishing to receive their publications by airmail should contact the Editor to make the necessary arrangement.

CORRESPONDENCE
HEPATITIS VACCINATION

Mr B.R. Edwards
Hon. Secretary
The New Zealand Institute of Medical Laboratory Technology (Inc)
Haematology Department
Christchurch Hospital
Christchurch

Dear Mr Edwards

Your letter concerning the variations in doses of Hepatitis B vaccine offered to laboratory staff was discussed by the committee at its last meeting.

The committee considered that the dosage given was an employer responsibility and recommendations in respect of a national programme of immunisation for Hepatitis B have been made in that the manufacturers recommended doses of vaccine should be used. The committee considered that any deviation from this is a matter between the employer and employee.

Yours sincerely
Nemu Lailu (Mrs)
Secretary, Communicable Disease Control Advisory Committee

Membership Sub-Committee Report

Since our November meeting there have been the following changes:

<table>
<thead>
<tr>
<th>Membership:</th>
<th>11.3.87</th>
<th>12.11.86</th>
<th>17.8.86</th>
<th>17.8.86</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less G.N.A.</td>
<td>1717</td>
<td>1724</td>
<td>1735</td>
<td>1792</td>
</tr>
<tr>
<td>Less deaths</td>
<td>24</td>
<td>10</td>
<td>24</td>
<td>78</td>
</tr>
<tr>
<td>(unfinancial)</td>
<td>251</td>
<td>—</td>
<td>—</td>
<td>9</td>
</tr>
<tr>
<td>Less deceased</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>plus applications</td>
<td>1432</td>
<td>1701</td>
<td>1709</td>
<td>1672</td>
</tr>
<tr>
<td>plus reinstatements</td>
<td>103</td>
<td>14</td>
<td>12</td>
<td>62</td>
</tr>
<tr>
<td>1536</td>
<td>1717</td>
<td>1724</td>
<td>1735</td>
<td></td>
</tr>
</tbody>
</table>

Application For Membership

Mrs Penelope SNOW, Wellington; Mr Darryl ROSS, Auckland; Miss Natalie CHEVIS, Auckland; Miss Patricia TAGGART, Dunedin; Mrs Andrea WESTON, Palmerston North; Miss Angela MDTYL, Auckland; Miss Gail BARRAR, Auckland; Miss Tracey SMITH, Dannevirke; Miss Alison FERGUSON, Auckland; Mr Bryan RAILL, Auckland; Ms Jacqueline NIELSEN, Auckland; Mr David BLOEMENDAL, Auckland; Miss Maria VANDEWAARDT, Auckland; Miss Angela WOODS, Wellington; Miss Jane FIELD, Wellington; Miss Megan HARRIGAN, Dannevirke; Ms Jacqueline HAGENSEN, Taunaranui; Miss Yvonne WUTHRICH, Tauranga; Miss Jany BRIGHT, Auckland; Miss Diana WALKER, Auckland; Mrs Fiona COLE, Auckland; Mr Steven SCHISCHIKA, Auckland; Miss Joanne McDONALD, Auckland; Miss Christine RONALDS, Auckland; Mr Peter ROBISON, Auckland; Miss Jacqueline RAYNER, Auckland; Miss Edwina ROGERSON, Auckland; Miss Jan HUTHCHINS, Auckland; Miss Roxanne CALDER, Auckland; Miss Tracy BRADFIELD, Invercargill; Miss Lynette EDEN, Invercargill; Miss Catherine BAIRD, Invercargill; Miss Tina BERTAULT, Auckland; Miss Elizabeth LAWRIE, Dargaville; Miss Christine WAGSTAFF, Tauranga; Miss Gina DAVIES, Auckland; Miss Wendy MUNRO, Auckland; Miss Charissa READE, Auckland; Miss Catherinne TOCKER, Auckland; Miss Deborah HOEY, Auckland; Miss Paulette BREKLEY, Auckland; Miss Wendy HUME, Auckland; Miss Jodi ROBERTS, Auckland; Miss Karen TURNER, Auckland; Miss Juliet KEEATING, Auckland; Mrs Tarisha PATEL, Whangarei; Miss Rachel MATTHEWS, Whangarei; Miss Alison DUNCAN, Dunedin; Miss Susan BRAAN-STROOD, Auckland; Miss Rachel GREENWOOD, Auckland; Miss Anna BAILIE, Hamilton; Miss Janine MANTON, Auckland; Miss Suzanna NATHOO, Auckland; Miss Monique LE LIEVRÉ, Auckland; Mr Harry PASESE, Auckland; Miss Michelle EASTON, Auckland; Miss Karen LAKER, Auckland; Miss Jennifer RUSSELL, Hamilton; Mr Shayne ANDREW, Hamilton; Miss Alison BLAKE, Hamilton; Miss Vania NAHA, Hamilton; Miss Karen PARKINSON, Auckland; Miss Ann TIPLER, Stratford; Miss Tracey KEREMETE, Christchurch; Miss Deidre STRATTON, Invercargill; Miss Kathryn SYKES, Christchurch; Mrs Lauren HALE, Christchurch; Miss Susan RIDDLE, Lower Hutt; Miss Trudy EDWARDS, Lower Hutt; Miss Megan FINLAYSON, Kawakawa; Miss Margot QUINN, Auckland; Miss Shona SMITH, Auckland; Miss Jan PRITCHARD, Whangarei; Miss Maria TOOMER, Palmerston North; Miss Mana WOOD ALLEN, Taunara; Miss Debra CRAIG, Tauranga; Miss Karyn REYNOLDS, Hawera; Mrs Julie PEACOCK, Auckland; Mr Timothy BRADLEY, Auckland; Mrs Heather OADES, Auckland; Mr Rodney SMITH, Auckland; Miss Bridget ARAHILL, Gisborne; Miss Louise ALLISON, Auckland; Miss Pamela SMITH, Dunedin; Miss Caroline MARINUS, Wellington; Miss Ekaterina DMITRIEFF, Auckland; Mrs Christine PRESTLEY, Hamilton; Miss Lisa BLOORE, Hamilton; Mrs Susan RAYNOR, Masterton; Miss Michelle POOL, Masterton; Miss Deborah MCPEHERSON, Auckland; Miss Joanne LESTER, Christchurch; Miss Kathryn PEELE, Auckland; Miss Evelyn slur, Auckland; Miss Angela SMITH, Auckland; Mrs Wendy DOUGLAS, Hamilton; Miss Greta MAKAN, Auckland.
Report to the Council of the NZIMLT on the Third Annual Meeting of the Fiji Medical Laboratory Technologists Association

Introduction:

The meeting was held in Suva, Fiji on the 5-7 December, 1986 at the Travelodge Hotel. There were approximately 45 registrants and the venue, one Conference Room, was well suited and equipped.

Programme:

The invited speakers were Drs J. Gwynne and J. Foagali (formerly of New Zealand, now of Brisbane, Australia), Dr K. Singh (local pathologist, and myself. The sessions were well organised and there was reasonable discussion for most. The quality of material generally was good with several local speakers giving excellent presentations.

General:

I had the opportunity to meet with Mr Rajendra Parmar, former and current President. He expressed a real interest in a continued liaison with the NZIMLT and, in particular, assistance with improvements in their training programme. To this end early in 1987 he will be sending a proposed curriculum for a possible Diploma Course to be run by the Fiji Medical School for us to consider. The curriculum he has written himself with comments from others. Presently their training consists of a three year course for a Certificate in Proficiency and he advises that there is a reasonable chance that this could be upgraded to a Diploma. His ultimate aim is to have a Bachelor Degree course but accepts that this is some years away. It has been agreed that their Annual Scientific Meeting will be scheduled earlier in the year, probably May/June, in an effort to attract New Zealand and Australian support. They will endeavour to supply details of their 1987 meeting as soon as possible so that it can be promoted in New Zealand.

Noticeable was the lack of trade support and this is an area in which the NZIMLT may well be able to assist in suggesting options to our commercial colleagues they might like to support the Fijian meeting.

Recommendations:

1. That we continue our support for the Fijian Medical Laboratory Technologists Association (FMLTA) and offer to promote their Annual Scientific Meeting to our membership and commercial colleagues.
2. That we consider sponsoring technical workshops either in conjunction with, or separate to their Annual Scientific Meeting.
3. That we consider sponsorship for the laboratory workers of other Pacific Islands to enable attendance at the FMLTA Scientific Meeting as the technologies and topics discussed at this meeting are more relevant to them than are most of the presentations at our Annual Scientific Meeting.

Observations:

1. It is clear that the FMLTA has progressed very well in the three years of its existence and I was very impressed by the degree of accord and unification between Fijian Medical Laboratory personnel. I was also impressed by the confidence, dedication and enthusiasm of many of their senior personnel.
2. It would be my impression that the future of this Association is very good and their Scientific meetings could become a major meeting for the Central Pacific Island Nations. Travel between Fiji and many of the Central Pacific Islands is far better than exists between them and New Zealand or Australia.
3. The Fijians indicated that they find communication and cooperation with New Zealand very good and would like this to continue.

W.J. WILSON,
Vice-President,
23 December, 1986.

---

**HS 48 AMENDMENTS**

9 February 1987

HSPC Circular 1987/8

CHIEF EXECUTIVES OF ALL HOSPITAL AND AREA HEALTH BOARDS

Dear Sir

HS48 1986 BLOCK A NEGOTIATIONS

1. Attached is Amending Determination No HS2326 which formally introduces amendments to the provisions for Bereavement Leave as a result of an agreement reached between the State Services Co-ordinating Committee and Combined State Unions in the 1986 Block A negotiations.

2. Boards have already been notified of amendments to the qualifying period of 20 working days' annual leave and the lodging allowance in HSPC Circular 1986/128, as a result of 1986 Block A negotiations. However one point in relation to the amended annual leave provision as it applies to employees who have resigned needs to be clarified.

3. Annual Leave

The amendment is effective from 1 December 1985 which means employees who will have completed 700 more years' service on or after 1 December 1985 will now be eligible for a fourth week of annual leave on the anniversary date of their appointment and in succeeding leave years. However, employees who qualify but who have resigned in the period...
12.95 to 6.8.86 inclusive are excluded from receiving an extra week's paid leave because 6 August 1986 was the date of agreement to this provision. Employees who qualify but who have resigned since 6 August 1986 may, on application to the board, be paid for an extra week's leave. I apologise for any inconvenience caused.

**Bereavement Leave for Death in New Zealand or Overseas**

4. The basic intent of this revised provision is to provide every reasonable opportunity for an employee to discharge any obligation and/or to pay respects to a deceased person with whom the employee has had a close association. Such obligations may exist because of blood or family ties or because of particular cultural requirements such as attendance at all or part of a Tangihanga (or its equivalent).

5. Approval for special leave on pay may be given by the board:

6. In granting time off, therefore, and for how long, the board must take into account the following points:

   (1) The closeness of the association between the employee and the deceased;
   (NOTE: This association need not be a blood relationship);
   (2) Whether the employee has to take significant responsibility for any or all of the arrangements to do with the ceremonies resulting from the death;
   (3) The amount of time needed to discharge properly any responsibilities or obligations;
   (4) Reasonable travelling time should be allowed, but for cases involving overseas travel that may not be the full period of travel;
   (5) A decision must be made as quickly as possible so that the employee is given the maximum time possible to make any arrangements necessary. In most cases the necessary approval will be given immediately, but may be given retrospectively where necessary;
   (6) If paid special leave is not appropriate then annual leave or leave without pay should be granted, but as a last resort.

7. The new HS48 provision refers to administrative advice in the Health Service Personnel Manual, Chapter 4.8. The Manual will be amended to incorporate the above advice on the application of this provision in due course. In the meantime the revised provision should be read in conjunction with the advice contained in this circular letter.

8. Any matters of doubt or difficulty should be referred to this office for decision.

Yours faithfully,

T.J. Neilson
for Chief Executive.

**HEALTH SERVICE AMENDING DETERMINATION NO HS2326**

Pursuant to the State Services Conditions of Employment Act 1977, the Health Service Personnel Commission hereby makes the following amending determination

**Application of Amending Determination**

1. Health Service Determination No HS48 as amended from time to time is further adjusted as follows.

2. Clause 7(1), Bereavement Leave, is revoked and is replaced with Clause 7(1). Bereavement Leave for Death in New Zealand or Overseas, which reads

'(a) A board may approve special bereavement leave on pay for an employee to discharge any obligation and/or to pay respects to a deceased person with whom the employee has had a close association. Such obligations may exist because of blood or family ties or because of particular cultural requirements such as attendance at all or part of a Tangihanga (or its equivalent). The length of time off shall be at the discretion of the board in accordance with the administrative advice set out in the Health Service Personnel Manual, Chapter 4.8.

(b) If a bereavement occurs while an employee is absent on annual leave, sick leave on pay, or other special leave on pay, such leave may be interrupted and bereavement leave granted in terms of subclause (1)(a) above. This provision will not apply if the employee is on leave without pay.'

3. A replacement page incorporating the amendment prescribed in paragraph 2 above is attached.

4. This amending determination shall take effect on and from the date of this determination.

Dated at Wellington this 8th day of February 1987.

J.R. MARTIN, Chairman  
M.C. BAZLEY, Member  
R. McEWAN, Member.

---

**NEW PRODUCTS AND SERVICES**

**GLOVES SHIELD HANDS FROM MOST CHEMICALS**

The Silver Shield glove is designed to offer totally dependable protection for workers handling a wide variety of dangerous materials for long periods of time.

"The Silver Shield is highly impermeable to more solvents, acids and bases than any other type of glove on the market today," says Mike Taylor of NZ Safety, which markets the Silver Shield.

It is made from Norfol, a light weight, flexible polyethylene laminate. Along with its resistance to permeation and breakthrough, the glove's light weight, flexibility and comfort make it a good choice for chemical and petrochemical laboratories, photo finishing, medical laboratories and a host of other applications.

The flexible film conforms ready to any hand shape; yet provides full protection. Each glove is amnetexxid, so no pairing is needed. Its lightness prevents worker fatigue, while its distinctive silver colour allows for easy identification.

Because the glove is disposable, it can be made readily available to workers. Its low cost means recycling is unnecessary. The 36cm long gauntlet protects the forearms when working with chemicals.

A further benefit of the Silver Shield is that it can be used as an inner glove. This allows maximum worker protection in heavy duty jobs applications where the dangers of mechanical damage are high. Three sizes are available — small, medium and large.

Packaging can be in single pairs or packs of 100 pairs. The packs can be wall mounted, out of the way but in the work area. A chemical and permeation guide is also available which is designed to be used.
as a starting point in helping to select the proper glove for handling the listed toxic chemicals.

For further information contact Hill and Knowlton (NZ) Ltd, P.O. Box 5070, Auckland or circle 128 on readers reply card.

NORTHROP INSTRUMENTS AND SYSTEMS LIMITED INTRODUCE A NEW MICROPROCESSOR-CONTROLLED MOISTURE BALANCE

The new MB301 Electronic Moisture-Balance from Ohaus features the latest in microprocessor technology. It is designed for rapid, automatic determinations of dry weight or moisture content of aqueous solutions, adhesives, cereals, chemicals, detergents, fertilizers, paint, paper, plastics, soists, pharmaceuticals etc.

This advanced instrument features random sample size to 300 grams, instant fanning of container weights and a self-calibrating percent range. Software controlled prompting of the moisture determination sequence simplifies operation of the Balance, reducing probable errors and minimizing operator training. An audible alarm indicates end of test. Microprocessor controlled heater automatically corrects for line voltage variations. The new MB301 Balance has a 300 gram capacity with 0.01 gram readability. RS232 serial bi-direction interface allows computer control of the moisture balance functions and provides data output to personal and laboratory computers.

For further information contact Northrop Instruments and Systems Limited, P.O. Box 2406, Wellington or circle 129 on readers reply card.

VITEK — FULLY AUTOMATED MICROBIOLOGY

In hours the Vitek will perform tests that manually take days or weeks.

The Physician can expect fast, usually same day, bacterial identification. Rapid pin-point accuracy of drug therapy leads to fewer antibiotic-resistant strains of bacteria.

Two systems are available depending on workload. They include the Vitek for the large Microbiology lab and the Vitek Jr now available for the under 200 bed hospital or smaller laboratory.

The Vitek has the capability to gather and receive input gathered through various Elisa readers and will accept the automatic transmission of 'Bactec' data. The Vitek has the power and interface capabilities to receive input from future immunodiagnostic devices, DNA probes and similar emerging technologies.

If you have been waiting for automated microbiology, have automation on capital, the system can be made available in your laboratory for a two week trial. Vitek can be seen at the Microbiology Conference in Auckland in May.

Marketed by Scientific Products Division Salmond Smith Biolab Ltd. Circle 130 on readers reply card.

BIORAD INTRODUCES NEW UNASSAYED CHEMISTRY CONTROLS TIED TO LYPHO CHEK COMPUTER QC PROGRAM

This new LYPHO CHEK b-level control product advances chemistry control technology by eliminating the separate diluent which can conserve up to 50% of the laboratory refrigerator's space. What's more, diluent-induced value fluctuations are eliminated — just add water for guaranteed CO2 values. And to let your money go even further, you can use LYPHO CHEK Chemistry Controls to the test drop due to extended reconstituted stability.

LYPHO CHEK Unassayed Chemistry Controls, Normal and Abnormal, also contain the most comprehensive list of control constituents of any other control in the laboratory market. More than 50 b-level utility constituents are included. That means virtually all of the laboratory's control requirements can be met with this one LYPHO CHEK chemistry control product. These include, among others, routine drugs, endocrine and general chemistries.

LYPHO CHEK Chemistry Control is offered in either human or bovine-based sera. All sera used in the human control material was tested and found negative for HTLV 111/1A V by ELISA LYPHO CHEK Unassayed Chemistry Control. Normal/Abnormal is offered in 50 x 10 ml packaging.

Marketed by Scientific Products Division Salmond Smith Biolab Ltd. Circle 131 on readers reply card.

SIGMA DIAGNOSTICS

If you are looking for Chloride & Magnesium Kits, both are available from Sigma Diagnostics.

They are quantitative, colorimetric determinations in serum for Chloride and serum or plasma for Magnesium. Methods and parameters can be offered for most analyzers in New Zealand.


SITUATIONS VACANT

Registered Medical Laboratory Technologist

Registered Medical Laboratory Technologist or experienced Q.T.A. required for a position in our Haematology Department.

Apply:

Directors,
Northland Pathology Laboratory,
P.O. Box 349
Whangarei

WORK WANTED

Senior Trainee Position Wanted — Microbiology

A British trained Technologist, associate of the British M.L.T.S., seeks a position in Microbiology in a New Zealand medical laboratory. He has had 14 years experience in the specialty covering most aspects of microbiology — media preparation, clinical bacteriology, TB, virology, cell culture and recently detection of HTLVIII antibody. Is required by MLTB to pass the specialist examination to obtain limited registration.

A full C.V. is available on request.

All enquiries to: H. Naughton, AIMLS, 135 Stuart Road, Bootle, Merseyside L20 9ES, ENGLAND.

Immunohematology

A 36-year-old Malaysian trained Technologist, B.Sc (Hons), eligible for limited registration in immunohaematology, seeks employment in a New Zealand laboratory. Has spent the past 10 years at the National Blood Transfusion Services Centre, Kuala Lumpur. Available to come to New Zealand for an interview. A C.V. and references available on request.

Contact: A. Thiruchelvam, No. 2, Jalan 5/13-F, Jalan Chanleks, Off Jalan Gasing, 46000, Petaling Jaya, MALAYSIA.

WANTED TO PURCHASE

Two Books Wanted

'Applied Blood Group Serology' Issitt
'Technical Manual' American Association of Blood Banks

Please contact: G.A. Heta, Laboratory, Taumarunui Hospital, Private Bag, TAUMARUNUI.
introducing

LYOPHILISED ANTIBIOTICS
for agar dilution susceptibility testing

With this product you can gain advantage through convenience and time saved as there is no weighing, etc.

We offer realistic prices on an extensive range of antibiotics
Roche E.I.A. Systems

from the World leaders in monoclonal antibody research

CEA - EIA
AFP - EIA
B - HCG - EIA

+ EIA Washer and Photometer

for further information please contact:
The Wellcome Rotavirus Latex Test
For the rapid qualitative detection of Rotavirus

SIMPLE TO USE
• An easy to follow protocol requiring no special conditions or equipment.
• Disposable droppers, mixing sticks and reaction cards are supplied with every kit.
• A simple and streamlined antigen extraction procedure.

FLEXIBLE
• No need to batch specimens for testing
• 1 - 3 specimens can be tested on each reaction card.

FAST
• Antigen extraction completed within 15 minutes.
• A definitive result in 2 minutes or less.

HIGH PERFORMANCE
• Sensitivity — 90%
• Specificity — 99%
• Predictive value of a positive result — 99.3%
• Predictive value of a negative result — 94.2%

CONVENIENT
• Eliminates delay, long turnaround times and the possibility of specimen spoilage and contamination.

The Wellcome Rotavirus Latex Kit is ideal for General Laboratory use and is easy to interpret.

Wellcome Diagnostics
Wellcome New Zealand Limited
P. O. Box 22-258 Otahuhu, Auckland 6.
THE NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY (Inc.)

MICROBIOLOGY OF SEXUALLY TRANSMITTED DISEASES

AUCKLAND

Tuesday 1 September 1987
Wednesday 2 September 1987
Thursday 3 September 1987

Medical School, Auckland University
Rm. 2064 — Ground Floor, Pre Clinical Bldg. Park Rd

ACCOMMODATION:

Available for a limited number at Nurses’ Home, Auckland Hospital.
Limited Attendance: 40 (suitable for qualified staff).
Charge: $55 (includes G.S.T.)

NAME: ________________________________________
ADDRESS: ____________________________________

Reply to:
Graham Thorne
Senior Tutor Technologist
School of M.L.T.
Wallace Laboratory
Auckland Hospital
MICROBIOLOGY OF SEXUALLY TRANSMITTED DISEASES — WET WORKSHOP

GUEST SPEAKERS:
Dr P.J. Say
Dept. of Venereology, Auckland Hospital.
Dr B. Bremner
Microbiology Dept, Auckland Hospital.
Dr D. Bromiley
Department of Venereology, Auckland Hospital.

TOPICS:

i Gonorrhoea
- isolation and culture methods
- identification — fluorescent antibody
  — rapid CHO
  — co-agglutination
  — Gono check enzyme
- sensitivity testing — PPNG
- antigen serology — monoclonal co-agglutination

ii Chlamydia
- isolation — culture
- antigen detection
- antibody serology
  Clinical aspects and treatment

iii Mycoplasma
- isolation and identification
  Clinical aspects and treatment

Mycoplasma Ureaplasma
- isolation and identification
  Clinical aspects and treatment

iv Gardenerella and Mobiluncus
- isolation and clinical aspects

SPECIAL SESSIONS:
- Sexual abuse and rape crisis
- Tropical venereal disease
- Handling large numbers of specimens

ORGANISED:
by Senior Microbiology Technologists (Auckland Area) and the STD Reference Laboratory Staff.
How the only fully automated system became the Nerve Center of the Microbiology Lab.
Hitachi 704

Just Another New Analyzer?

- fully selective
- 20 channels + 3 ISE
- flexible software program
- throughput max. 180 tests/h (20 parameters) up to 360 tests/h with ISE option and Twin Tests
- 24 hours STAT-capacity
- 36 system packs: tailor made reagents with proven BM-quality, more to follow...

BOEHRINGER MANNHEIM NZ LTD
P.O. Box 62-089
Sylvia Park,
AUCKLAND.

or Circle 142 on Readers Reply Card