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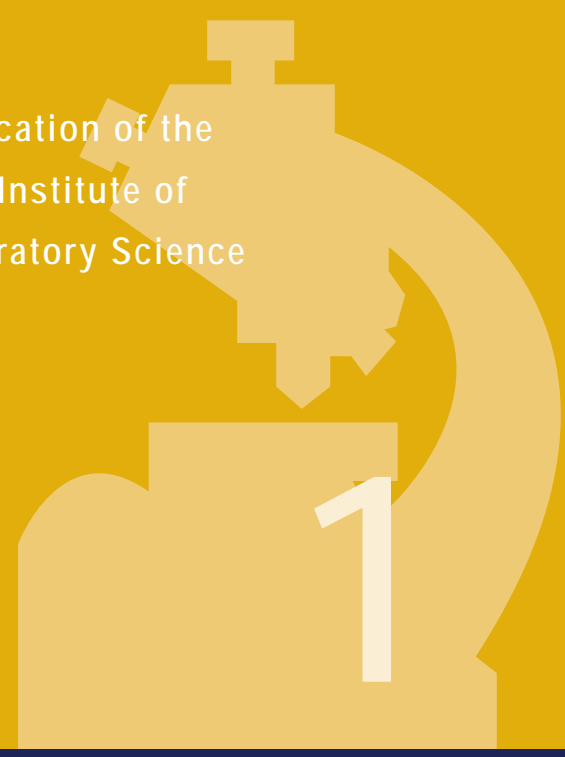
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The *New Zealand Journal of Medical Laboratory Science* (the Journal) is the official publication of the New Zealand Institute of Medical Laboratory Science (NZIMLS). The Journal is peer reviewed and publishes original and review articles, case studies, technical communications, and letters to the Editor on all subjects pertaining to the practice of medical laboratory science. The Journal is open access (www.nzimls.org.nz/nzimls-journal.html) and is published three times per year in April, August, and November. Hard copies are circulated to all NZIMLS members and universities and research units in New Zealand and overseas. Current circulation is about 2,200 copies per issue. Printing is by Wickliffe (NZ) Ltd., Christchurch on environmentally responsible paper using elemental chlorine free third party certified pulp sourced from well managed and legally harvested forests and manufactured under the strict ISO14001 Environmental Management System. The Journal is indexed by CINAHL, EMBASE, SCOPUS, Informit, Thomson Gale, EBSCO and Biosis Citation Index, and the Journal Editors are members of the World Association of Medical Editors (www.wame.org).

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In this issue

Rob Siebers, Editor

Human sperm cryopreservation is a viable option for fertility preservation of patients diagnosed with cancer or requiring orchidectomy prior to undergoing medical intervention. Semen is well endowed with various antioxidants in order to resist possible oxidative injury to sperm. The effect of cryopreservation on seminal total antioxidant capacity has not yet been documented. In this issue, Banihani and colleagues from the Jordan University of Science and Technology investigated the level of reduction in seminal total antioxidant capacity upon semen cryopreservation -thawing, compared this reduction with cryoprotectant medium alone, and correlated this reduction with age. They found that cryopreservation of human semen reduces the seminal total antioxidant reservoir, but was not correlated with age. They state that further studies are required to standardise the level of total antioxidant capacity for uppermost sperm quality after cryopreservation.

Immunoglobulin D multiple myeloma is considered a rare subtype of myeloma, accounting for less than 2% of all myelomas, associated with an increased frequency of undetectable or small monoclonal protein levels in electrophoresis. It also accompanied with an aggressive course, resistance to chemotherapy and poor outcome. In this issue, Bakheet and colleagues from Kuala Lumpur present a case study and literature review of a 71-year old man presenting with a history of low back pain for two months and during follow-up a worsening of renal function and decreasing haemoglobin levels. Routine immunofixation electrophoresis of the serum and urine samples showed kappa light chains but was negative for anti IgG, A and M. Further immunofixation with IgD and IgE antisera identified IgD-kappa paraproteinaemia and kappa light chain in the urine. The authors recommend performing immunofixation for IgD routinely for all patients with suspected multiple myeloma as many cases are misdiagnosed as light chain disease.

NZIMLS Journal Prize

Council of the NZIMLS has approved an annual Journal prize to the value of NZ\$300 for the best article published in the Journal during the calendar year. The article can be a review article, original article, case study, research letter, or technical communication (excluded are Fellowship dissertations).

Many studies are presented at the Annual Scientific Meeting, SIG meetings, and the North and South Island Seminars, yet are rarely submitted to the Journal for wider dissemination to the profession.

Consider submitting your presentation to the Journal. If accepted, you are in consideration for the NZIMLS Journal Prize and will also earn you valuable CPD points.

Please contact the Editor or any Editorial Board Member for advice and help. Contact details are on the NZIMLS web site (www.nzimls.org.nz) as are instructions to authors.

No formal application is necessary but you must be the 1st author and a current financial member of the NZIMLS to be eligible. All articles accepted and published during the calendar year (April, August and November issues) will be considered. The Editor, Deputy Editor and the President of the NZIMLS will judge all eligible articles in December. Their decision will be final and no correspondence will be entered into.



The 2015 winner of the NZIMLS Journal Prize is Rebecca Busch from Canterbury Health Laboratories, Ashburton for her case study: Panton-Valentin leucocidin cytotoxin-positive *Staphylococcus aureus*. A case study. *N Z J Med Lab Sci* 2015; 69(3): 94-96.

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Human semen cryopreservation reduces the seminal antioxidant reservoir

Saleem Ali Banihani, Razan F Alawneh and Ayman Abu-Awad
Jordan University of Science and Technology, Irbid, Jordan

ABSTRACT

Background The effect of cryopreservation on particular antioxidants in human semen has been examined in a number of published studies. However, the effect of cryopreservation on total antioxidant capacity of human semen has not yet been investigated.

Aim: To study how total antioxidant capacity of human semen samples, from males of couples who failed to achieve a clinical pregnancy after at least one year, is affected by cryopreservation.

Methods: Semen samples (n = 77), with and without the addition of cryoprotectant medium, were cryopreserved for at least 72 hr and tested for total antioxidant capacity before and after cryopreservation using the cupric ion reducing antioxidant capacity method.

Results: Cryopreservation of human semen samples significantly decreased ($P < 0.05$) their total antioxidant capacity levels. In addition, cryopreservation of the cryoprotectant medium decreased its total antioxidant capacity. No significant correlation was found between seminal total antioxidant capacity before cryopreservation and the decrease in seminal cryopreservation after cryopreservation, and male age.

Conclusions: cryopreservation of human semen reduces the seminal total antioxidant reservoir, and this reduction was found not to correlate with age. Further studies are required to standardise the level of total antioxidant capacity for uppermost sperm quality after cryopreservation.

Key words: Cryopreservation; human semen; sperm; total antioxidant capacity.

N Z J Med Lab Sci 2016; 70: 03-06

INTRODUCTION

Human sperm cryopreservation, cooling of sperm to sub-zero temperatures ($-196\text{ }^{\circ}\text{C}$), is a viable option for fertility preservation of patients diagnosed with cancer or requiring orchidectomy prior to undergoing medical intervention (1,2). Moreover, sperm cryopreservation is crucial in certain cases with poor semen quality (i.e., testicular failure) where assisted reproductive technologies, such as in vitro fertilization, are desired (3).

In men, the ejaculated semen is well endowed with various antioxidants in order to resist possible oxidative injury to sperm. This oxidative damage is found to be handled primarily by reactive oxygen species such as hydroxyl radical, superoxide ion, and hydrogen peroxide (4). The imbalance between reactive oxygen species and antioxidants to the favor of reactive oxygen species leads to oxidative stress (5), which in turn causes sperm injury or death (6). Therefore, an effective antioxidant defense mechanism surrounding the sperm appears indispensable for adequate sperm function.

The antioxidant mechanism surrounding human sperm encompasses enzymatic and non-enzymatic antioxidants (7,8). The enzymatic mechanism includes antioxidant enzymes such as superoxide dismutase, glutathione peroxidase, and catalase (8,9). While the non-enzymatic mechanism typically includes antioxidant molecules such as ascorbic acid, glutathione, α -tocopherol, L-carnitine, urate, ubiquinol, pyruvate, taurine, and carotenes (7,8,10,11).

The effect of cryopreservation on some antioxidants in human semen has been documented in a number of published studies. For example, cryopreservation of human semen was found to reduce the antioxidant activity of L-carnitine (12,13). Another study by Gadea *et al.* demonstrated a significant reduction in glutathione content after human semen cryopreservation (14).

Moreover, a significant reduction in the activity of superoxide dismutase was noted after cryopreservation of human semen (15). Although the evidence above shows the effect of cryopreservation on certain antioxidants in human semen, the study that shows the effect of cryopreservation on seminal total antioxidant capacity has not yet been done to our knowledge. We hypothesized that cryopreservation decreases the level of total antioxidant capacity of human semen, and this decrease is correlated with age. In this study we investigated the level of reduction in seminal total antioxidant capacity upon semen cryopreservation -thawing, compared this reduction with the one by the cryoprotectant medium alone, and correlated this reduction with age. We performed this study on patients who attended the andrology laboratory as their samples are the target of the cryopreservation.

METHODS

Subjects and sample collection

Semen samples were randomly collected over a 9-month period in 2014 from 75 males who attended the andrology laboratory at the King Abdullah University Hospital in the north of Jordan. All enrolled males failed with their spouses to achieve a clinical pregnancy after one year or more of regular unprotected intercourse. Semen samples were collected by masturbation after 72 hours of sexual abstinence and analysed according to the guidelines of the World Health Organization (2010). The study was explained to all of the enrolled subjects by the researchers, and written informed consent was obtained prior to enrollment. Approval for the study was provided by the IRB Committee at Jordan University of Science and Technology, Irbid, Jordan.

Experimental design

Each fresh semen specimen ($2\text{-}200 \times 10^6$ sperm mL^{-1}) was gently homogenised using a 1 mL pipette and divided into 2

aliquots (A and B) with equal volumes. Aliquot A was further divided into 2 aliquots; the first was tested directly for total antioxidant capacity, while the second was cryopreserved in liquid nitrogen. Aliquot B was mixed with the cryoprotectant medium (Irvine Scientific, Santa Ana, CA, USA) and similarly divided into 2 aliquots; the first was tested for total antioxidant capacity while the second was cryopreserved in liquid nitrogen. After at least 72 hours, the cryopreserved aliquots were thawed at room temperature (25°C) and analysed for total antioxidant capacity. Independently, the total antioxidant capacity was measured for the cryoprotectant medium alone, before, and after cryopreservation.

Cryopreservation

An aliquot of the cryoprotectant medium was added to the specimen and gently mixed for 5 min. This step was repeated to give a final 1: 1 (vol/vol) ratio of the cryoprotectant medium to the semen sample. Cryovials containing the specimen were placed in a freezer at -20 °C for 8 min and in liquid nitrogen vapor at -80 °C for 2 hours (13). The vials were transferred to the liquid nitrogen at -196 °C for at least 72 hours, and then they were removed and thawed at 25 °C for 20 min. The average sperm recovery for all tested samples was 47.8 ± 16.8% (mean ± SD).

Measurement of total antioxidant capacity

Each tested aliquot, before and after cryopreservation, was centrifuged at 300 g for 5 min and the supernatant (cell-free seminal plasma) was tested for total antioxidant capacity using the cupric ion reducing antioxidant capacity (CUPRAC) method. This method was chosen to measure the total antioxidant capacity in human semen because of its reliability, sensitivity, and suitability for biological fluids (16,17). Briefly, 1 mL of working solution (0.02 M CuCl₂ solution), 0.0075 M neocuproine alcoholic solution, and 1 mL ammonium acetate buffer solution at 1:1:1 (vol/vol/vol) were mixed in a centrifugation tube with 12.5 µL of seminal plasma. All reaction tubes were centrifuged for 3 min at 750g. Carefully, the supernatant (cell-free medium) from each centrifuged sample was collected, and the absorbance of the formed colored complex was measured against the reagent blank at 450nm after 30 min incubation at room temperature.

Statistical analyses

Results are reported as the means ± SEM. Statistical analysis was performed using the Student's paired *t*-test to compare the means of the 2 groups. One-way analysis of variance (ANOVA) was used when more than two groups were compared (GraphPad Prism 5.01 computer software; GraphPad Software, Inc., CA, USA). Analyses of relationships between variables were performed using Spearman's nonparametric correlation analysis. Statistical significance was set at the *p* 0.05 level.

RESULTS

Figure 1 illustrates the effect of cryopreservation on the total antioxidant capacity of human semen as evaluated by the CUPRAC method. The absorbance at 450nm is proportional to the total antioxidant capacity of semen. There was a significant decrease (*P* < 0.0001) in the absorbance at 450nm, and thus in total antioxidant capacity, using the CUPRAC method after semen cryopreservation with and without cryoprotectant medium supplementation (0.650 ± 0.028 vs. 0.579 ± 0.025, and 1.070 ± 0.025 vs. 0.980 ± 0.028, respectively; *n* = 77).

Figure 2 illustrates the correlation between the absorbance at 450nm, and between the total antioxidant capacity of human semen as evaluated by the CUPRAC method and the patient's age. As illustrated in this figure, the total antioxidant capacity of human semen decreased slightly with age, but this was not statistically significant.

Figure 3 illustrates the correlation between the reduction in the absorbance at 450nm, and thus in the semen total antioxidant capacity, as evaluated by the CUPRAC method after cryopreservation (without cryoprotectant medium supplementation) and the patient's age. As illustrated in this figure, the reduction in semen total antioxidant capacity after cryopreservation versus patient's age was not statistically significant.

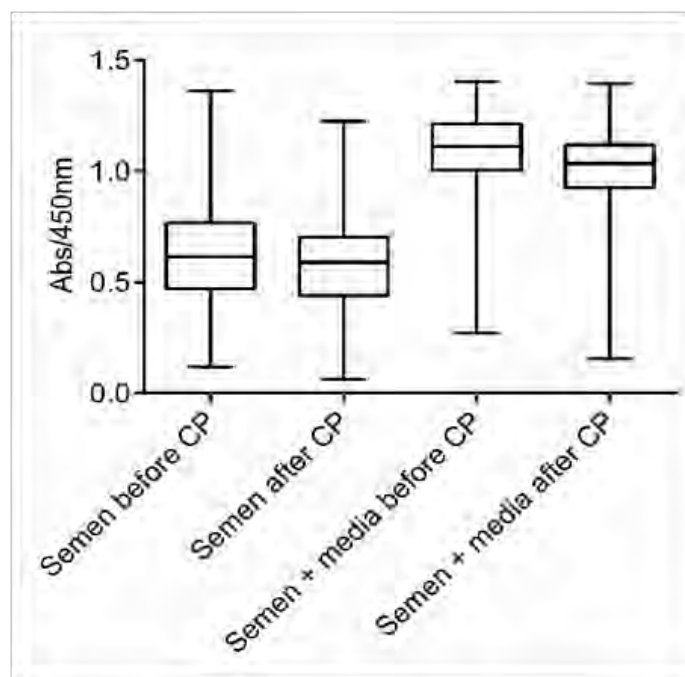


Figure 1. Effect of cryopreservation on TAC of human semen with and without cryoprotectant medium supplementation as evaluated by the CUPRAC method. The absorbance at 450nm is proportional to the total antioxidant capacity. Values are given as the means ± S.E.M (*n* = 77; *P* < 0.0001).

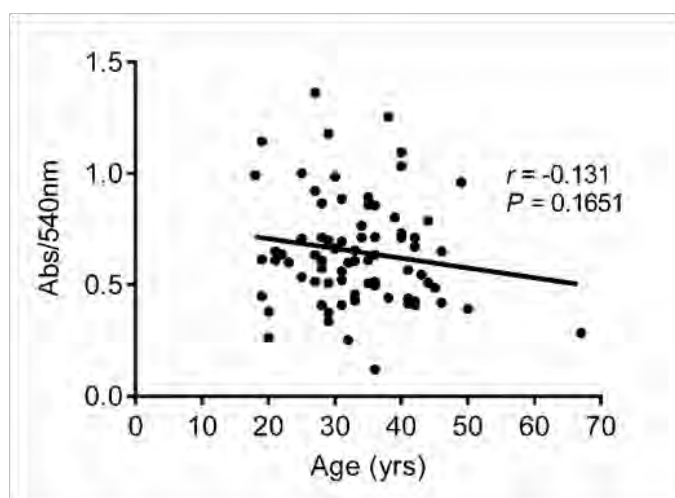


Figure 2. Correlation between age and seminal total antioxidant capacity. The absorbance at 450nm is proportional to the total antioxidant capacity (*n* = 77).

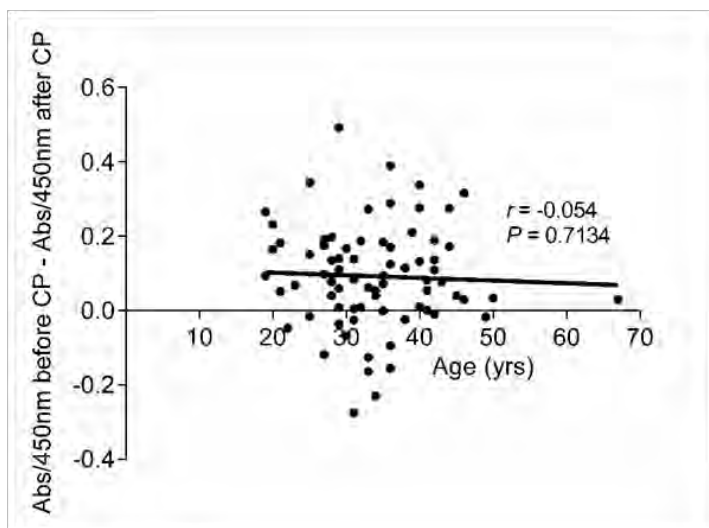


Figure 3. Correlation between male age and reduction in total antioxidant capacity after semen cryopreservation (without cryoprotectant medium supplementation). The reduction in absorbance at 450nm after cryopreservation is proportional to the reduction in total antioxidant capacity (n = 77).

DISCUSSION

Although many studies have examined the multifaceted effects of cryopreservation on different antioxidant parameters of semen, to the best of our knowledge, this is the first study to test directly the effect of cryopreservation on total antioxidant capacity of human semen from infertile men. We hypothesized that cryopreservation of human semen decreases the level of seminal total antioxidant capacity. The results from this study are in concordance with this assumption by demonstrating that cryopreservation of human semen samples significantly decreases the level of their total antioxidant capacity.

Cryopreservation has been found to induce the formation of reactive oxygen species in human semen samples (18). Studies show that sperm cryopreservation-thawing leads to alterations in NADPH oxidase in the plasma membrane and to alterations in the electron transport chain of the mitochondria, which enhance the generation of reactive oxygen species (19,20). The generated reactive oxygen species in the cryopreserved semen could be behind the decrease in seminal total antioxidant capacity. Besides, the accumulation of reactive oxygen species leads to oxidative stress, an imbalance between oxidants and antioxidants, and lipid peroxidation, and thus to a reduction in the post-thaw recovery of sperm (1,2).

Alternatively, in cryopreservation, due to removal and dilution of seminal plasma, sperm experience a substantial reduction in the antioxidant reservoir (i.e., ascorbate, urate, alpha tocopherol, hypothaurin, taurin, carotenoids, and glutathione). Such weakening in the antioxidant defense mechanism surrounding the sperm increases the chance of exposing sperm membranes to oxidative injury. In fact, the plasma membrane of human sperm contains considerable amounts of polyunsaturated fatty acids that can easily be oxidised by reactive oxygen species (21).

The evidence above explains why manufactured cryoprotectant media are supplemented with antioxidants. However, the amount of these antioxidants, and thus the total antioxidant capacity in the cryoprotectant medium is not properly standardized for premium sperm recovery after cryopreservation. For example, in this study, the absorbance at 450nm utilising seminal plasma after cryopreservation was 0.65, and the absorbance at 450nm for seminal plasma supplemented with cryoprotectant medium after cryopreservation was 0.98; indicating a 69% increase in the absorbance, and thus in the total antioxidant capacity reservoir surrounding the sperm. Such increases should be standardised to obtain the uppermost sperm recovery.

In fact, standardising the increase in total antioxidant capacity reservoir surrounding the human sperm after cryopreservation is very important because antioxidants, in general, are a double-edged sword with opposing effects if the safety threshold dose is exceeded. For example, an in-vitro study on human sperm by Donnelly *et al.* demonstrated that higher concentrations (> 20 μ M) of vitamin C, a key antioxidant in human semen, has a negative effects on sperm quality, especially sperm motility (22). Another in-vitro study by Banihani *et al.* showed that higher doses (50 mM) of L-carnitine, a potent antioxidant present in human semen, significantly decreased human sperm motility and viability (11). Therefore, a random (i.e., unstandardised) increase in the antioxidant activity surrounding the sperm after cryopreservation may not provide the desired sperm recovery.

Independently, in this study, we investigated the correlation between age and the level of seminal total antioxidant capacity (before and after cryopreservation). A previous study conducted on infertile men (n= 52) aged between 21- 52 found a negative correlation between seminal total antioxidants and age (23). The results from this study did not show a significant decrease in total antioxidant capacity versus age. The contradiction between both studies may due to the method of assaying the seminal total antioxidants and the size of the population involved (18-70 yr vs. 21-52 yr). Furthermore, our study for the first time investigated the correlation between the decrease in total antioxidants by the effect of cryopreservation and age. The results here did not show a significant correlation between these two variables.

CONCLUSIONS

In summary, the results from this study suggests that cryopreservation of human semen reduces the effectiveness of the antioxidant defense mechanism surrounding the sperm, and this reduction is not associated with age. Further studies are required to optimise the seminal total antioxidant capacity after cryopreservation to reach the uppermost sperm quality. This optimisation should be primarily achieved by standardising the amount of antioxidants that are added to the cryoprotectant media before cryopreservation.

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NZIMLS ANNUAL SCIENTIFIC MEETING 2016 WORKING TOGETHER

YOU ARE WELCOME!

The New Zealand Institute of Medical Laboratory Science Annual Scientific Meeting for 2016 will be held at the Rotorua Energy Events Centre from 16-19 August 2016.

The Energy Events Centre is the perfect venue for conferences incorporating no less than ten separate spaces and comprehensive services. Positioned at the edge of Lake Rotorua, the Energy Events Centre's unique location within the picturesque Government Gardens provides extensive car parking and is also within easy walking distance of the retail precinct, accommodation, restaurants, cafes and spa facilities.

Our meeting theme for 2016 is 'Working Together'. In modern laboratories it's all about collaboration. Most of the work we do today involves multiple disciplines and multiple laboratories. We work with a wide range of external services, whether they be hospitals, general practitioners, research companies and others. Our staff, after hours, also work across the discipline boundaries. We plan to bring you an exciting and varied range of topics demonstrating examples of teamwork enhancing patient and client outcomes. We hope our programme will bring you an interesting perspective from across the laboratory spectrum as well as outside of it.

The organizing committee cordially invite you and your company to participate in this meeting. We welcome you to share your experiences, to present, to debate and to participate in all streams of the programme.

We look forward to Working Together with you, to bring you a stimulating and thought provoking conference.

Raewyn Cameron & Jo Hartigan
Programme Coordinators



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AN ANNUAL SCIENTIFIC MEETING WITH LOTS TO OFFER

Our theme is **WORKING TOGETHER – The Essence of Laboratory Science.**

Essence: The attribute or set of attributes that make an entity what it fundamentally is. (*wikipedia.com*)

Working Together: In our modern laboratories it's all about collaboration. Everyone has to work together for the benefit of the patient and the service we provide. Whether it is between disciplines within the laboratory, within the hospital or within the region, there are many examples of clinical and laboratory teams getting together to get it done. Most laboratories are no longer single disciplines (unless you're from the big smoke!); our staff are core staff who work across many disciplines in a single shift. We hope to bring you examples of all those positive situations where teamwork shines through! Come and join the party! We'll be waiting for you!

OUR LOGO

The Blue and Gold colours are not only those of our NZIMLS but also the Bay of Plenty representative colours – our own local flavour.

The circular pattern resembles a *koru*, often used in Maori art as a symbol of creation and a return to the point of origin (hence the 'essence'). It is also an abstract representation of a DNA helix along with the theory of both large and small groups working together for the one goal. Pretty awesome aye! (*Thanks to Sally Smyth for her creative prowess*).

OUR TEAM

Scientists from Laboratory Services Rotorua and the Pathology Associates Group are all working together to bring you something special. Raewyn Cameron and Jo Hartigan are our Programme coordinators working alongside Fran van Til and the team at NZIMLS. For more information, and offers of proffered papers, contact Fran van Til fran@nzimls.org.nz or www.nzimls.org.nz.

CASE STUDY

IgD-kappa multiple myeloma. Case report and brief review of the literature

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ABSTRACT

Immunoglobulin D multiple myeloma is considered a rare subtype of myeloma, accounting for less than 2% of all myelomas. It is associated with an increased frequency of undetectable or small monoclonal protein levels in electrophoresis. It also accompanied with an aggressive course, resistance to chemotherapy and poor outcome. We report a 71-year-old man with a background history of chronic kidney disease. He presented with history of low back pain for two months and noted during follow-up worsening of his renal function and decreasing trend of haemoglobin levels. Subsequent workup for multiple myeloma showed presence of a small monoclonal protein band between the beta and gamma region in serum protein electrophoresis. Urine protein electrophoresis showed presence of Bence-Jones proteinuria. However, the routine immunofixation electrophoresis of the serum and urine samples showed kappa light chains but was negative for anti IgG, A and M. Further immunofixation with IgD and IgE antisera identified IgD-kappa paraproteinaemia and kappa light chain in the urine. Bone marrow examination showed infiltration by plasma cells, which was further confirmed by immunohistochemistry staining and in situ hybridization. Furthermore, fluorescence in situ hybridization analysis showed deletion of 13q14.3. He was given various chemotherapy regimes, which he was refractory to. This case is reported to highlight the necessity of performing immunofixation for IgD routinely for all patients with suspected multiple myeloma as many cases are misdiagnosed as light chain disease.

Keywords: immunoglobulin D, multiple myeloma, renal failure, velcade, 13q14.3 deletion.

N Z J Med Lab Sci 2016; 70: 08-11

INTRODUCTION

Multiple myeloma is a malignant disorder characterized by the proliferation of a single clone of plasma cells that produce monoclonal protein and are derived from B cells in the bone marrow (1). This proliferation results in extensive skeletal involvement, with osteolytic lesions, anaemia, hypercalcaemia and/or soft tissue plasmacytomas (2). In addition, the excessive production of nephrotoxic monoclonal immunoglobulin can result in renal failure and the lack of functional immunoglobulins may lead to potentially life-threatening infections (2). Multiple myeloma comprises about 10-15% of haematopoietic neoplasms and leads to 20% of deaths from haematologic malignancies (3). The incidence of multiple myeloma is twice as high in blacks as in whites and is lower in Asian populations. Multiple myeloma is slightly more frequent in men than in women and the median age at diagnosis is 65–70 years (2).

Multiple myeloma of the IgD isotype is a rare entity, accounting of 1- 2% of all reported myeloma cases in the literature (4). Given their rarity, the characteristic features of this disorder have mostly been collected from case reports or larger case series (5). This condition is more common in men than in women; often accompanied by hepatomegaly, lymphadenopathy, extraosseous lesions, renal failure, and amyloidosis; and has a poorer prognosis than other multiple myeloma isotypes with a median survival time of 13–21 months (4).

We report here one of the rare variants of multiple myeloma, namely IgD-kappa multiple myeloma. Its clinical course, response to therapy and outcome is highlighted.

CASE REPORT

A 71-year-old man, with a background history of diabetes mellitus, hypertension and chronic kidney disease, was referred to our center for multiple myeloma work-up as the patient had history of low back pain for two- months and was noted to have deteriorating renal function and decreasing trend of haemoglobin levels. Physical examination was unremarkable apart from pallor. There was no lymphadenopathy or hepatosplenomegaly.

His full blood count report revealed anaemia (haemoglobin 8.1 g/dL) with normal white blood cell and platelets counts. Peripheral blood smear showed no Rouleaux formation, circulating plasma cells, or leukoerythroblastosis. Blood chemistries showed elevated levels of urea (9.1 mmol/L) and creatinine (200 umol/L). The liver function tests yielded normal results. His serum total protein, albumin and albumin adjusted calcium levels were normal; 72 g/L, 46 g/L, and 2.47 mmol/L respectively. His ESR (9 mm/hr) and LDH level were also normal (233 U/L). The patient's biochemistry results are summarized in Table 1. A spinolumbar radiograph demonstrated osteolytic lesions in both T11 pedicles. The serum protein electrophoresis (agarose gel) showed the presence of a monoclonal band in between beta and gamma regions and urine protein electrophoresis showed presence of Bence-Jones protein. The immunofixation electrophoresis of the serum and urine reported as IgD-kappa paraproteinaemia (Figure 1).

At diagnosis, the SPE showed small M-band in between beta and gamma regions with a quantitation of 2.8g/L, whereas the UPE showed Bence-Jones protein of 1.1 g/L. The immunofixation electrophoresis of the serum and urine samples showed kappa light chains but was negative for anti IgG, A and M. The sample then was sent to a referral pathology laboratory, for possible presence of IgD and IgE, and reported as IgD-kappa paraproteinaemia. Quantification of the serum immunoglobulins was as follows: IgG; 666 mg/dL (reference range, 751-1560) and IgM; 10 mg/ dL (reference range, 46-304). Furthermore, the serum free light chain assay showed high level of free kappa (3890.0 mg/L) and normal level of free lambda (15.0 mg/L) with serum free K/λ ratio of 59.33 (reference range, 0.26-1.65). In contrast to the common isotype of MM where the serum M-protein is usually >30g/L of IgG and >20g/L of IgA (3), our patient serum M-protein quantification was of 2.8g/L in keeping with the literature review (5, 7). Furthermore, his serum immunoglobulins quantification's were reduced, these findings were consistent with previous reports by Shimamoto et al and Blade et al (19, 20).

The bone marrow aspirate showed presence of 20% plasma cells. The plasma cells were heterogenous in size with moderate amount of basophilic cytoplasm and displayed eccentric nuclei and clumped chromatin pattern with perinuclear halo. Numerous mott cells and occasional plasmablasts were also noted (Figure 2). These findings were consistent with multiple myeloma. Furthermore, the trephine biopsy sections showed interstitial infiltration of the bone marrow by sheets and clusters of plasma cells (Figure 3). Additionally, these plasma cells showed kappa light chain restriction by *in situ hybridization*. The cytogenetics showed no chromosomal abnormalities. However, FISH analysis showed deletion of 13q14.3 in 5% of the analysed cells.

Whole body fluorodeoxyglucose- positron emission tomography/computed tomography scan for disease assessment demonstrated solitary skeletal involvement (T11 vertebra) with no evidence of extramedullary involvement. As a part of the staging procedure, β2-microglobulin level was done which revealed a high level (8.83 ug/L; (reference range: 1.1 - 2.6). He was staged as IIIB according to the international staging system and was started on melphalan/thalidomide/prednisolone (MPT) chemotherapy along with bisphosphonate and radiotherapy conducted for T10-T12 region.

Three months later after completion of the 3rd course of chemotherapy, he was admitted complaining of bilateral lower limb weakness to the point where he was unable to walk unaided with associated numbness for three days. For this, an urgent MRI of the spine was performed to rule out acute spinal cord compression. This showed diffuse vertebral metastases and worsening T11 compression fracture with spinal cord compression and significant T11 exiting nerve root compression bilaterally. Spinal cord decompression together with posterior instrumentation and fusion was done. Histopathological examination of the thoracic spinal bone fragments was consistent with osseous plasmacytoma.

The patient received a total of seven courses of MPT chemotherapy. However, in view of the suboptimal response to the treatment, the chemotherapy regimen was changed to velcade/dexamethasone/thalidomide (VDT). He did well initially after starting this bortezomib-containing regimen, his routine serum protein electrophoresis showing undetectable M-protein band but persistent Bence-Jones proteinuria in the urine protein electrophoresis. Unfortunately, subsequent serum protein electrophoresis revealed the presence of a M-protein band with a paraprotein quantitation of 15.7g/L and urine protein electrophoresis showed the presence of urine Bence-Jones protein with a quantitation of 4.4 g/L. Half way through this

chemotherapy regime, he developed peripheral neuropathy secondary to thalidomide, thus this drug was stopped but velcade/dexamethasone was continued.

Later, he developed acute renal failure secondary to dehydration and hypercalcaemia. His condition took a downfall when he developed *Pseudomonas* septicemia and metabolic acidosis. Following this he declined further treatment and was placed on palliative care. Eventually, he developed multiorgan failure and succumbed to his condition.

Table 1. Patient's relevant biochemistry results.

Blood test	Result	Reference range
Urea mmol/L	9.1	3.2 – 7.4
Creatinine umol/L	200	63.6 – 110.5
Total Protein g/L	72	64 – 83
Albumin g/L	46	34 – 48
Albumin-adjusted calcium mmol/L	2.47	2.14 – 2.58
LDH U/L	233	125 – 220
ESR mm/hr	9	1 - 20

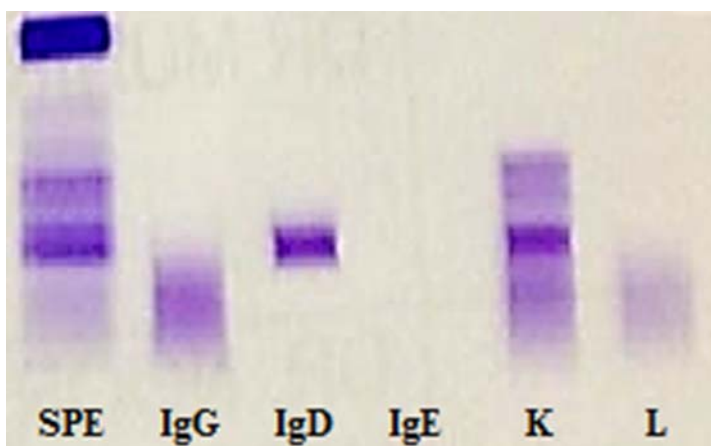


Figure 1. Immunofixation electrophoresis of the serum sample showing IgD-kappa paraproteinaemia.

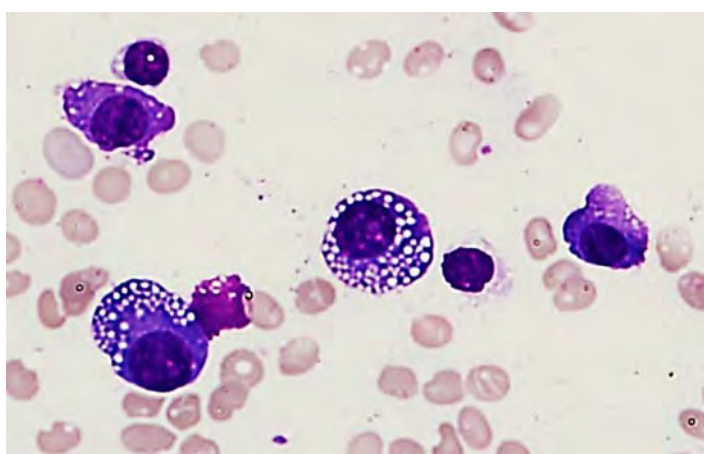


Figure 2. Bone marrow aspirate showing plasma cells and mott cells. MGG x600.

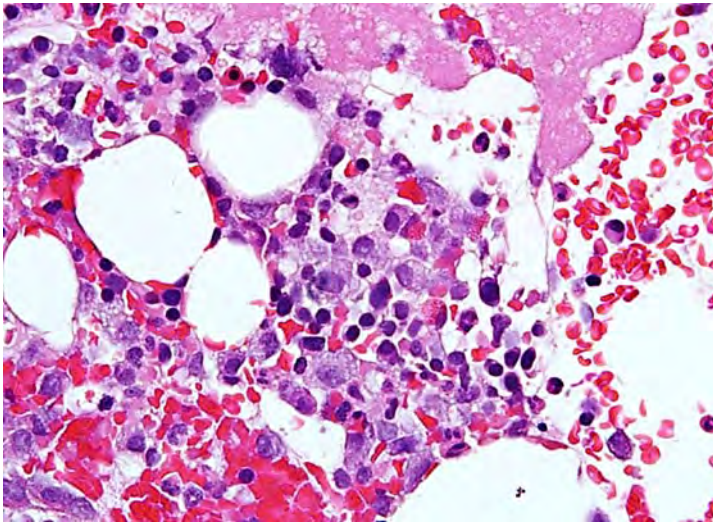


Figure 3. Bone marrow trephine biopsy section showing bone marrow infiltration by clusters of plasma cells and some plasma cells with multiple cytoplasmic vacuolation (mott cells). H&E x600.

DISCUSSION

Immunoglobulin D multiple myeloma (IgD MM) was first recognized by Rowe and Fahey in 1965 (6). It affects less than 2% of all patients with MM and is known to have a more aggressive clinical behavior than other subtypes of MM (6).

CLINICAL FEATURES

A review of the literature showed that the clinical features of IgD multiple myeloma are similar to those of IgG multiple myeloma, IgA multiple myeloma, and light chain myeloma. However, patients with IgD multiple myeloma were younger at time of presentation, had a male predominance; and higher rate of bone lesions, anaemia, hypercalcaemia and renal failure (4,6,7). Spinal cord compression is the most common neurological complication of all MM subtypes and reported in 11-24% of patients (8). Most cord-compression lesions occur due to a pathological fracture of the involved vertebral body or extension of a vertebral body myeloma lesion (8). Lolin et al reported that extra-osseous spread and soft tissue tumors were common in IgD multiple myeloma and more than 50% of the patients had lymphadenopathy, splenomegaly and hepatomegaly (9). Furthermore, plasma cell leukaemia and amyloidosis were reported more frequently in IgD multiple myeloma than the other types of multiple myeloma (10). IgD multiple myeloma is characterized by a small or absent M-protein band in electrophoresis, a Lambda (λ) light chain bias, and Bence-Jones proteinuria, which occurred in at least 90% of patients (7). Morris et al found that albumin, β_2 microglobulin and serum creatinine levels were higher and haemoglobin concentrations were significantly lower in IgD multiple myeloma compared with more common myelomas (11). Additionally, IgD multiple myeloma was reported more likely to present at an advanced stage, have a more aggressive clinical course, and a poorer prognosis with a shorter period of survival (4, 12). Nevertheless, the underlying tumor biology responsible for the differences between IgD multiple myeloma and other myeloma isotypes have yet to be determined (4, 13).

IMMUNOGLOBULIN ANALYSIS

Laboratory analysis of IgD multiple myeloma cases by serum protein electrophoresis typically demonstrated a minimally detectable M-protein spike, often in the beta, gamma, or beta-gamma region (5). A large percentage of cases may show hypogammaglobulinaemia or a normal serum electrophoretic pattern making detection of the paraprotein difficult (5).

However, Bence Jones proteinuria appears in almost all patients (5). Since immunofixation for IgD is not routinely performed many cases are misdiagnosed as light chain disease (5). Because of the issue of frequent small or undetectable M-protein on standard serum protein electrophoresis, Stulik et al analysed the serum from four IgD MM patients using two-dimensional (2D) gel electrophoresis.

In this study they detected heavy chains of IgD M-protein using high resolution 2D-gel electrophoresis, with demonstration of both size and charge differences between the various monoclonal immunoglobulins examined. Based on these results, the authors considered 2D-gel electrophoresis has higher sensitivity and resolution of the IgD paraproteins than the conventional gel electrophoresis (14). Furthermore, Lolin et al (1994) suggested that immunofix with IgD and IgE antisera should routinely be performed for all patients with a suspected Bence-Jones proteinuria myeloma, irrespective of whether a suspicious band was detected on serum protein electrophoresis or after immunofixation with light chains (9). In addition, Amy et al found that some features can suggest the presence of IgD such as: (a) higher concentration of free light chains than usual in the serum, (b) urine free light chains that migrate on electrophoresis to a point different from that seen with the serum (15). Two studies have mentioned that patients with renal failure of unknown cause, bone pain, small serum M-protein bands, or undefined Ig isotype should be suspected of having IgD multiple myeloma (4,13).

Lambda (λ) -type light chains were found in 60-95% of IgD M-components (12). The rarity of IgD Kappa (κ) secretion was explained by a block in the assembly, glycosylation, and secretion of this immunoglobulin or rapid intracellular catabolism of IgD κ destined for secretion (16).

CYTOGENETICS

More than 50% of patients with IgD multiple myeloma have chromosomal abnormalities (4). Monosomy or deletion of chromosome 13 (13q14) is found in nearly half of multiple myeloma cases by FISH (3) and it associated with an inferior outcome (17). Lu et al found that there were no significant differences in terms of cytogenetic abnormalities between IgD and IgG multiple myeloma types using conventional karyotyping and FISH analysis (12). Juge-Morineau et al analysed the immunoglobulin heavy chain V-region (Ig HV) genes of three IgD, one IgM, and one biconal (IgG and IgM) multiple myeloma for the presence of somatic mutations based on molecular analysis of the Ig HV. That study illustrated that IgD and IgM were rare variants derived from a preswitched memory B cell that had passed through a stage of positive antigenic selection and was no longer exposed to the somatic mutation process or able to undergo further isotype switching in vivo (18).

STAGING

The clinical staging systems proposed by Durie and Salmon or by the British Medical Research Council have shown to be important in predicting the prognosis. However, these staging systems did not include IgD multiple myeloma because its rarity made analysis difficult. Thus, no data are available concerning the staging of IgD multiple myeloma (19). Some studies suggested that IgD multiple myeloma should be considered as a rare subgroup of multiple myeloma with aggressive features rather than a single parameter of poor prognosis (4,13).

Shimamoto et al, based on multivariate analysis of 165 cases with IgD multiple myeloma, found that λ light chains and a white blood cell count of more than $7 \times 10^9/L$ were adverse prognostic markers. In light of these findings, they proposed a new staging system specifically for IgD myeloma using these two prognostic factors; the light chain subtype and leukocyte count.

Accordingly, patients were divided into three risk groups; low, intermediate and high risk. The overall survival rate was 66% in low risk patients, 23% in intermediate risk patients and 0% in high risk patients (19). Whereas, Kim et al found that the prognostic factors for reduced overall survival rate in patients with IgD multiple myeloma were advanced age, the presence of cytogenetic abnormalities such as del(13) or hypodiploidy, extramedullary plasmacytoma, and high serum β 2 microglobulin. Additionally, in the same study they found that 89% of IgD multiple myeloma patients had λ light chain and that these patients had poorer outcomes than those with κ light chains (4). On the other hand, Blade et al reported that the median survival of patients with κ vs λ light chains were 20 months and 29 months respectively (20).

IgD multiple myeloma is reported to have a poor prognosis and worst survival compared to other multiple myeloma isotypes (12). Morris et al reported a progression-free survival of 27 months vs 24 months in non-IgD vs IgD multiple myeloma respectively, while median overall survival rate was 62 months vs 43 months ($P = .0001$). Interestingly, response to therapy both before and after autologous stem cell transplantation reported by the aforementioned study was better in patients with IgD multiple myeloma compared with other isotypes; however, this did not translate into increased survival. Similarly a greater proportion of IgD myeloma patients achieved complete remission after transplantation (11). As a result of the discovery of new drugs such as bortezomib and thalidomide, the complete remission rate and long-term survival rate of patients with multiple myeloma have improved worldwide over the past 10 years (12). Little is known regarding the effectiveness of autologous stem cell transplantation or the effects of the new drugs in patients with IgD multiple myeloma. Most studies were small case series, lacking complete data on individual patients and yielding contradictory results (4). However, some studies have suggested that new drugs such as bortezomib, thalidomide, and lenalidomide, as well as autologous stem cell transplantation, may improve the outcomes of patients with IgD multiple myeloma (4,13).

CONCLUSIONS

We described a rare case of IgD-kappa multiple myeloma in a 71-year-old man, staged as IIIB and associated with unfavourable cytogenetics. Although his initial serum and urine protein electrophoresis revealed a small M-protein band and Bence-Jones proteinuria; however, the routine serum and urine immunofixation showed kappa light chains but was negative for the common MM isotypes. The diagnosis of IgD- kappa multiple myeloma was established only after further immunofixation with IgD and IgE antisera. During the clinical course, he suffered from spinal cord compression caused by osseous plasmacytoma, and progressive deterioration of his renal function. He was started on MPT; however, due to partial response to the treatment chemotherapy regimen was changed to a bortezomib-containing regimen. Ultimately, he developed multiorgan failure and succumbed to his condition. The case is reported to address the necessity of routine immunofixation with IgD and IgE antisera, irrespective of whether a suspicious band is detected on serum protein electrophoresis, to avoid a false diagnosis of non-secretory or light chain myeloma.

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News from the Universities

Medical Laboratory Science Programmes

MASSEY UNIVERSITY



Top third year Massey BMLSc student 2015 and winner of the NZIMLS student prize - Casey O'Byrne.

Casey O'Byrne is a third year student at Massey University about to enter her fourth year of the Bachelor of Medical Laboratory Science programme. In 2016 Casey will be undertaking a placement with the

New Zealand Blood Service in Wellington to study Advanced Transfusion Science and also has a place studying Clinical Microbiology with LabCare Pathology in New Plymouth. During her time at Massey University Casey was the third year student representative for her degree, and enjoyed playing social league netball and soccer.

Before studying at Massey University Casey attended both New Plymouth Girls' High School and Napier Girls' High School. At High School Casey discovered a passion for science, in particular biology and the health sciences. While exploring potential careers in health Casey stumbled upon the Bachelor of Medical Laboratory Science and has never looked back.

OTAGO UNIVERSITY

By Cat Ronayne, Senior Teaching Fellow, Department of Pathology, Dunedin School of Medicine

The BMLSc class of 2015 graduated on Saturday 5th December with many students graduating with distinction or credit. They were:

BMLSc with Distinction

Catherine Shon
Ghobrial Roufail
Jamie Kuah
Jessica Bungard
Krista McFadzien
Mae Grant
Tracey Gourlay

BMLSc with Credit

Bethany Teasdale
Brogan Carr
Claudia Done
Jackie Cao
Jason Wong
Jenny Chu
Noor Shadood
Rebecca Chan
Sheree White
Shonal Krishna
Tim Ryan
Xi He

Prize winners

Roche Diagnostics Haematology Prize:
Professor Sandy Smith Prize in
Medical Microbiology:
AACB Chemical Pathology Prize:
Colin Watts Prize for top student
overall (over 3 years):
Prince of Wales nomination:
The NZIMLS Prize for top
4th year student:
The top 3rd year student:
The top 2nd year student:

Tim Ryan

Tracey Gourlay
Jessica Bungard

Catherine Shon
Catherine Shon

Jenny Chu
Katelyn Brook
Bethany Mills

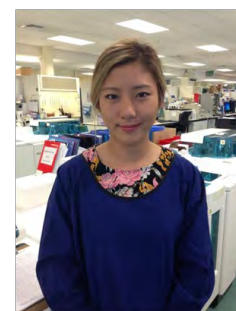
2016 looks to be busy with accreditation processes by both the Australian Institute of Medical Scientists and the Medical Sciences Council of New Zealand. We are developing a formal memorandum of understanding with Fiji National University, and have another visit from students and staff planned for mid-year. We will also be welcoming our first credit transfer student from Malaysia, as part of our MOU with the International Medical University. Over the summer break we have been busy, streamlining our procedures for 4th year and would like to thank all of our clinical partner laboratories across NZ and Australia for taking our students on placement. We look forward to working with you all again in 2016.

Top graduates' interviews

Catherine Shon

What made you decide to become a medical laboratory scientist?

The forever advancing medical field fascinates me. Becoming a medical laboratory scientist meant that I could utilize my scientific knowledge and become a part of the patient's clinical journey to treatment.



You are originally from Auckland, what attracted you to Otago University?

As most out-of-town students do, the idea of being away from home to become an independent young adult was attracting. No regrets there, I had the best three years of my life with plenty of memories to cherish, gained an incredible amount of knowledge and made life-long friends.

Which aspects of the course did you like best? Which aspects did you find most challenging?

I enjoyed the entire course and found all my papers very interesting. Learning from the best lecturers made studying very immersive and not boring in the least. Self directed learning is encouraged in third year which can be a bit tricky to get a hang of at first, but once the initial phase had passed, I could really make the most out of it and use my time more efficiently. Self directed learning provides as a nice stepping stone for the transition into clinical placement year.

What do you like about medical laboratory science?

There is so much to learn. Even after completing the course I try to question every little detail and keep up with current studies. Medical laboratory science can be a life-long learning career. Knowing that your professional knowledge and skills play a crucial role in a patient's diagnosis and wellbeing is very rewarding. We were taught to always remember that at the end of the day, there is a patient at the other end.

Your clinical placements were in LabPlus and Middlemore. What were they like?

My clinical placement at LabPlus was an experience to remember. The staff put a huge effort into organising the course so that I could learn as much as I possibly could in so many different areas of the laboratory. Special mentions to Paul Austin, Section leader of Serology and Roy The, Technical specialist in Allergy who made the learning experience the best it could've possibly been.

Middlemore Hospital laboratory had a lot to offer too, special mentions to Simon Jones, Haematology Technical Head and Jacquie Case, Section leader of special haematology and Lynn Palmer, Section leader of morphology for offering so much of their extensive knowledge in the field of Haematology. Both clinical placements enabled me to extend my knowledge and furthermore, increased my passion for medical lab science.

What are you up to now?

Currently I'm employed as a scientist at LabPlus, ADHB in the specialist chemical pathology department. Fun fact, I'm also training to become a competing powerlifter.

What are your plans for the future?

I am planning to return to studying as soon as I can. I'm still making a decision in which further career path I'll take, I'm rather interested in becoming more involved in the clinical side of the medical field so that I can work closer with patients. Really excited for the future!

Tim Ryan

What made you decide to become a medical laboratory scientist?

I originally studied a Bachelor of Science in Microbiology & Immunology at Otago and towards the end of my third year I was introduced to the concepts of diagnostic medical microbiology and fell in love with it. One of the teaching staff said that I should look into Medical laboratory science and the rest is history.



You are originally from Timaru, what attracted you to Otago University?

I chose Otago because of the University's strong history, as well as a love for Dunedin itself. That and I already had friends who were studying at the University. This made for an easy decision and I never looked back!

Which aspects of the course did you like best? Which aspects did you find most challenging?

Being able to clearly and distinctly apply knowledge that we were learning on a daily basis to particular pathologies was a lot of fun and made study more compelling.

I had found that with my BSc topics were often abstract and hard to apply to real world scenarios but everything we were taught in the medical laboratory science programme was career applicable and given alongside excellent examples. As far as the challenges go I would have to say that histology & cytology were the most challenging for me, but not for any particular reason.

What do you like about medical laboratory science? And microbiology and haematology in particular?

Medical laboratory science appeals to me in the sense that I'm doing something that I'm genuinely interested in and it's helping people who are often in desperate need of the labs aid in their diagnosis. I personally found this particularly true in microbiology and haematology because work in these parts of the lab are often part of acute emergency presentations. Microbiology is also just a fascinating subject whereby we're looking at organisms that are fighting back against modern medicine, which always keeps the work new and extremely interesting. Haematology is also a really interesting subject because of the sheer complexities associated with blood homeostasis and pathology.

Your clinical placements were in Northland. How did you find that experience?

Northland hospital was an amazing place to do my placements. The staff here are all extremely knowledgeable and friendly.

What are you up to now?

I'm currently working in a dual-role position at Northland hospital in the mortuary as a mortuary scientist and also in microbiology as a scientist.

The microbiology role was a natural path for me but the mortuary was a new opportunity which arose during my time here and offered me contact with the public and individuals from other emergency services, which is something that's always been very important to me but lacking to most scientist roles. Every day is something new and interesting and I can't ask for much more than that.

What are your plans for the future?

Right now it's nice to be on a study break after six years of University, but at the same time the idea of furthering my education is still appealing.

Fellowship of the NZIMLS

The NZIMLS encourages members to consider Fellowship as an option for advancing their knowledge and career prospects. Fellowship provides an attractive option to academic postgraduate qualifications at a fraction of the cost.

Recently, changes to the regulations have been made, the main one doing away with the examination route to Fellowship.

Fellowship of the NZIMLS may be gained by thesis, by peer reviewed publications; or by treatise in case of a member holding an appropriate postgraduate or professional qualification.

Thesis

The thesis must be based on the style of Master of Science by thesis requirement of New Zealand universities.

Publications

A minimum of ten peer reviewed publications in international or discipline acknowledged biomedical journals. The candidate must be the 1st or senior author of at least six of these publications. A comprehensive review of the submitted publications is also required.

Treatise

By submission of a treatise in the form of a dissertation of 3000 - 5000 words on a medical laboratory science subject. The dissertation may take the form of a review, development of a hypothesis or any other presentation that meets with the approval of the Fellowship Committee

Candidates going for Fellowship by this route must be holders of at least a Master's degree in medical laboratory science or a closely related subject; or have a professional qualification such as Fellowship of the following professional bodies: the Australian Institute of Medical Science; the Institute of Biomedical Science; the Faculty of Science of the RCPA, the Australian Association of Clinical Biochemists, or the Royal Institute of Biology (London).

Fellowship Committee

The Fellowship Committee comprises three current Fellows from whom further information can be obtained. They are:

- Rob Siebers (Chair) rob.siebers@otago.ac.nz
- Ann Thornton ann.thornton@otago.ac.nz
- Jillian Broadbent cpd@nzimls.org.nz

For full Fellowship regulations and the application process visit the NZIMLS web site at www.nzimls.org.nz

Pre-Analytical Group Splits

Ailsa Bunker
Charge Scientist, Patient & Specimen Services
CMDHB Middlemore Hospital Laboratory

Well not really! The South Pacific Congress 2015 heralded a new era for the Pre-analytical Group. At this Congress, for the first time, Phlebotomy and Specimen Services split into different concurrent forums to provide subject specific presentations for each specialty. Both specialties drew the crowds with more chairs required for the smaller room where the Specimen Services sessions were held. In fact the room at one stage became so full, that even with the extra chairs, it was standing room only.

The inclusion in a plenary session of Professor Giuseppe Lippi from the University of Parma, Italy was gratifying for the Pre-analytical service people. Professor Lippi is a world renowned expert in pre-analytics with over a thousand publications on the subject. It was good to see the importance of pre-analytics being presented to the whole delegation, not just to the converted.

Twyla Rickard, Operations Manager and Supervisor of Inpatient Laboratory Services, Mayo Clinic in Minnesota, USA was at the last New Zealand hosted, South Pacific Congress in 2007. She was such a great speaker then she was invited again to share her extensive knowledge and experience of Phlebotomy, and the development great work environments using behavioural science concepts.

This conference also attracted proffered papers from within New Zealand and abroad for both Pre-analytical specialties as well as support from our laboratory and industry colleagues. *Well look at that. It's green! Causes and implications for laboratory testing* presented by Anne-Marie Christensen, Queensland University of Technology, piqued interest. Deborah Orr, Operational Supervisor from Mackay base Hospital Queensland presented *Measuring aseptic technique*. Closer to home, Ajesh Joseph's from Waikato Hospital Laboratory revealed *the mysteries behind the pneumatic tube system: What's new and how to cope with a spill*. The speakers and topics were all excellent and too many to mention.

I do wish however to acknowledge the final speaker of the Pre-analytical sessions, Yvonne Willering ONZM of International Netball Silver Ferns player and coaching fame. Did you know she started out as a Medical Laboratory Technologist / Scientist? Yvonne gave her presentation on *Building great teams* with a healthy dose of humour and practicality. All present found her inspirational and a great end to an excellent conference.

It was not all serious. The conference dinner had a 1930s theme and delegates dressed for the occasion and had an enjoyable time. The food and venue of the Langham, Auckland was amazing. This environment created a perfect backdrop to view the trade displays and meet with others in our industry. One Langham staff member commented that they thought we all knew each other really well as it was such a happy event. They didn't realise that many had only just met.

If you feel disappointed to have missed out on the 2015 Congress then make sure you get in quickly for the next opportunities. This year, 2016 will have more exciting events for general laboratory and pre-analytical topics. Check out the NZIMLS website which is updated regularly. Do get involved. I guarantee you will not regret it!



David and Jane Kendall, Medlab Central, Palmerston North



Left to right:
Deborah Orr, MacKay, Queensland, Australia
Jane Kendall, Medlab Central, Palmerston North
Twyla Rickard, Mayo Clinic, Minnesota, USA
Ailsa Bunker, Middlemore Hospital, Auckland
Joanna Barnes, Northshore Hospital, Waitemata, Auckland
Annette Bissett, Northshore Hospital, Waitemata, Auckland



Bettina Heaton, LabPlus



NZIMLS ANNUAL SCIENTIFIC MEETING 2016 Rotorua Events Centre, 16-19 August

Silver Sponsor



Confirmed international speakers:

HENRY BISHOP

Henry Bishop began his career at CDC as a laboratory assistant in 1984. He has worked in the Diagnostic Reference Laboratory for about 20 years. This laboratory now resides in the Parasitic Diseases Branch in the Division of Parasitic Diseases and Malaria within the Center for Global Health. "We use what some would call 'old-fashioned' methods since we use microscopy to identify organisms based on morphology, rather than molecular or other more modern and cutting edge methodologies. However, we do rely on those methods when microscopy is not enough," he said. "Our charge is to be able to look at a specimen and identify whatever parasites may be present-from A to Z."

Bishop also conducts or assists in training programs that focus on the diagnosis of parasitic diseases both in the US and globally, and engages in international collaborations requiring laboratory support. "I am also proud to be part of the DPDx team which is a component of the DPDx Project. A major factor of the project is teleradiology, which uses the Internet for communicating and sharing images and expertise globally," he said. "Instead of mailing specimens like we did in the past, we can now share, study and diagnose parasitic diseases using digital images via the Web, and greatly reduce the time and cost."



PROFESSOR MIKE MURPHY

MD, FRCP, FRCPath, FFPATH

Mike Murphy is Professor of Transfusion Medicine at the University of Oxford and is Consultant Haematologist for NHS Blood & Transplant (NHSBT) and the Oxford University Hospitals.

The work done by Mike and his Oxford colleagues using technology to improve the safety and effectiveness of transfusion practice has won numerous national awards and serves as an exemplar for the National Health Service Quality, Innovation and Productivity initiative.

Mike is a recipient of the British Blood Transfusion Society's Kenneth Goldsmith Award, and co-founded the NHSBT Clinical Studies Unit, its Systematic Reviews Initiative for transfusion medicine and the Transfusion Evidence Library (www.transfusionevidencelibrary.com).

Currently, Mike is chairing a guideline on blood transfusion for the National Institute for Health and Clinical Excellence (NICE). He is a Board Member of the American Association of Blood Banks. He has received numerous research grants and is the author of more than 250 articles. He has co-edited all four editions of the textbook Practical Transfusion Medicine.



More information and registration details available at www.nzimls.org.nz

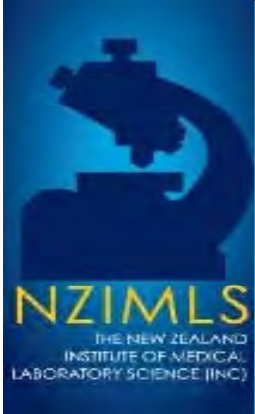


NZIMLS Presents the North Island Seminar 2016

“The Fellowship of Pathology”

Saturday 21st May 2016

Waipuna Hotel, Auckland



Presentations Invited Contact:

Ross Hewett

Rossh@adhb.govt.nz

Nadia Al Anbuky

Nadiaa@adhb.govt.nz

**Registration & coffee
9.00 am to 10.00 am
Finish 5.00 pm approx**

Invited presentations from:

**Presentations on Phlebotomy, Specimen Services,
Molecular Diagnostics, Biochemistry, Haematology,
Microbiology, Anatomical Pathology, Cytology, Virology
Immunology, Point of Care, Automation, Information
Technology, Quality Management, Laboratory Management,
Case Studies.**

Prizes for:

**Best Presentation,
Runner-up Best Presentation**



Registration for the North Island Seminar is only available online at www.nzimls.org.nz



Microbiology SIG

Dunedin Centre

Saturday 18th June 2016



We want your presentation!

Details at www.nzimls.org.nz

email : megan.sullivan@sclabs.co.nz

or gayleen.parslow@sclabs.co.nz

.... and we promise not to mention the current Super15 Rugby champions much



MORTUARY SIG PRESENTS

2016 SEMINAR
WHANGAREI

WHERE THE SURF MEETS THE TURF

Saturday 12 November

***Whangarei Hospital
NDHB 2nd Floor Conference Room***



This year featuring a number of interesting and informative presentations by our own Technicians

Supported by local Specialists



Visit the latest refurbished Mortuary in New Zealand

Enjoy beautiful and very friendly Northland

Other SIG members are welcome to register and attend

Book accommodation early!

Any further information you require please contact

Clive Matthews clive.matthews@northlanddhb.org.nz

***Registration only available at www.nzimls.org.nz
(from August 2016)***





THE Pacific WAY

Established in 1980, the Pacific Paramedical Training Centre (PPTC) is a not-for-profit incorporated organisation located on the Wellington Hospital campus, New Zealand. The PPTC is a Collaborating Centre of the World Health Organisation, Western Pacific Region, and its mission is to provide training in the appropriate medical laboratory sciences, external quality assurance programmes and its development related assistance for the clinical laboratory and blood transfusion services. Particular emphasis being placed on the developing countries of the Pacific region.

The teaching and development aid programmes offered by the PPTC are governed by one principle: *'They must be appropriate, affordable and sustainable for the health care setting in which they will be used'*. The emphasis is on appropriate and practical short-term training, that will ensure immediate benefit for the trainees in their work setting. In 1990 the PPTC was designated a WHO Collaborating Centre for External Quality Assurance and is now the leading provider of EQA Programmes to the Pacific Islands.

In 2006 the PPTC commenced a Distance Learning Programme in conjunction with WHO and now provides courses in the majority of the medical laboratory science disciplines in addition to the teaching and training courses provided in-country and at its centre in Wellington.

The PPTC has extensive experience working in laboratory strengthening throughout the Pacific and it is well respected by Pacific Governments for its ability to understand and work within Pacific cultures.

Through the continued support of the New Zealand Overseas Development Programme, the PPTC has been granted a new five year contract (2016 – 2020) in order to deliver its Pacific Laboratory Quality Accreditation Programme.

The activity design on which the five year contract is based, was formulated as a result of a comprehensive analysis of the issues and state of laboratory services in the Pacific throughout 2015. Following from this, it has been decided to target investment to four specific countries as being more likely to achieve sustainable gains and transformational development especially if funding per country was to be increased to a higher level, rather than the PPTC investing smaller amounts in a larger number of countries. In this situation, this would prevent the PPTC from spreading its services too thinly across the region. Countries selected for specific investment include Samoa, Solomon Islands, Tonga and Vanuatu.

This activity aligns itself with the New Zealand Aid Strategic goals to improve the health of the people in these Pacific countries as a key achievement focus area and investment priority.

This initiative will improve the health of our Pacific people and the regional health status against infectious disease outbreaks and enable early detection of chronic diseases through improved medical laboratory diagnostic services. It will improve Pacific Health through quality improvement measures established within the medical laboratory services.

Such measures will ensure that the services are appropriate, affordable and sustainable to support diagnostic health services and treatment options.

This will be achieved by,

- Increasing the workforce capability and capacity of Pacific laboratories
- Strengthening the infrastructure and expanding the scope of testing within laboratory services

The programme to be delivered by the PPTC will:

- Develop an accreditation framework for each selected Pacific medical laboratory, that enables it to be measured against international ISO15189 standards
- Support laboratories in the four selected countries to continue the progress towards the development and achievement of internationally recognised accreditation standards

This will be achieved in the following way:

- improve laboratory capability and capacity for the detection and management of infectious diseases, their diagnosis and the monitoring risk of non-communicable diseases and associated safe management of blood transfusion products
- increase the quality of laboratory sensitivity testing and antibiotic advice to clinicians to ensure that the most appropriate antibiotic is used. This will contribute to international endeavours to address the rise of anti-microbial resistance
- increase the sustainability of laboratory services by increasing the range of tests able to be performed in-country, thus increasing the timeliness of results and reducing the reliance on expensive off-shore referral testing
- Provide an external quality assurance programme and regional benchmarking for laboratory performance and associated risks
- Provide foundational courses for Pacific laboratory technicians through in-country centre based training and distance learning.

For further information contact:

PPTC, PO Box 7013 Wellington
New Zealand
Telephone: +64 4 389 6294
Fax: +64 4 389 6295
Email: pptc@pptc.org.nz;
Website: www.pptc.org.nz

DIPLOMA IN EXPERT PRACTICE IN HISTOLOGICAL DISSECTION (DEP)

Memorandum of Understanding between the Institute of Biomedical Science (IBMS) UK and the New Zealand Institute of Medical Laboratory Science (NZIMLS)

NB: More information is available by contacting the NZIMLS Executive Office



Background

For a number of years Histology dissection has been performed in New Zealand medical laboratories by a diverse workforce ranging from Anatomical Pathologists, Registrars, Medical Laboratory Scientists and Technicians, and Pathology Assistants.

The training has been varied and standards and competencies developed by the medical laboratories themselves to suit their particular requirements. In 2010 and 2014 two dedicated dissection workshops were offered by LabPLUS, ADHB with United Kingdom expert scientists, Gordon McNair and Carol Turnbull presenting and running the theoretical and practical programmes.

During this time, approaches had been made to the three NZ institutions offering the Medical Laboratory Science degree to develop a local post-graduate qualification in Histology dissection. However it was not considered feasible for such a specialist subject.

The Institute of Biomedical Science (IBMS), the UK professional body equivalent of the NZIMLS did offer a Diploma of Expert Practice in Histological Dissection, but only to their UK based membership.

Contact was made with the IBMS by the NZIMLS regarding access to the IBMS qualification for suitably qualified NZIMLS members registered as Medical Laboratory Scientists with the Medical Sciences Council of New Zealand.

Separate meetings were held with IBMS Councilors Allan Wilson and Gordon McNair while visiting New Zealand to determine and agree on what criteria access would be granted to NZ scientists to the IBMS examination. It was with the support of Allan and Gordon that the IBMS Council has now agreed for NZ based scientists to enter this Diploma programme extramurally on the following terms and conditions.

Candidate Criteria

1. Be a Member of the Institute of Biomedical Science. Application will be supported by the NZIMLS.
2. Be a NZ registered Medical Laboratory Scientist with a current annual practising certificate.
3. Have a Bachelor of Medical Laboratory Science Degree or equivalent.
4. Have five years' post-graduation experience in Histology.
5. Have the NZIMLS approval for their application.
6. Have the documented support of their laboratory manager, medical head of department and a named Consultant Pathologist mentor.
7. Have at least two years current practical experience in the dissection of histological specimens.

Candidate Criteria to sit the final examination

1. Be a member of the Institute of Biomedical Science.
2. Satisfactory completion of the IBMS / RCPATH training logbook.
3. A portfolio of evidence approved by the IBMS / RCPATH Conjoint Examination Board.

Roles and Responsibilities

The NZIMLS agrees to:

1. Ensure all candidates are suitably experienced and qualified and to maintain a record of the check for inspection if required.
2. Ensure all candidates complete an IBMS membership application form and return it the IBMS along with a copy of current annual practicing certificate and Bachelor of Medical Laboratory Science Degree (or equivalent) certificate.
3. Ensure all candidates have the signed support of their laboratory manager, medical head of department and a names Consultant Pathologist mentor.
4. Take responsibility for the portfolio submission.
5. Provide a suitable venue and host for the examination.
6. Provide an appropriate member of the NZIMLS for liaison in respect of examination organisation and invigilation.
7. Ensure adherence to IBMS standards of security and confidentiality of papers.
8. Ensure that at least one of the invigilators of the examination will be someone who has no vested interest in the outcome of the results.
9. Oversee the copying of the completed written papers, and to ensure that a copy is retained on file in New Zealand before they are physically sent to the IBMS head office in the UK, and to do this within the time frame stipulated by the IBMS.

The IBMS agrees to:

1. Admit to IBMS Membership suitably qualified and endorsed members of the NZIMLS.
2. Communicate clearly deadlines for portfolio submission and payment for examination fees.
3. Assess the submitted portfolios and respond within the same period as set for UK based candidates.
4. Send the examination papers to a single, key point of contact within the NZIMLS.
5. Undertake the marking of the completed exam papers and respond within the same period as set for UK candidates.
6. Provide diplomas to successful candidates.
7. Provide written feedback to unsuccessful candidates.

The above criteria, roles and responsibilities were the basis of the MoU signed in December 2015 by Nick Kirk, President of the IBMS and myself as President of the NZIMLS.

It is for two years initially and the “pilot” for further development and partnership between our respective organisations and for the ultimate benefit of our membership and medical laboratory science in general, especially for those wishing to advance to further qualifications.

Entry to the DEP in Histological Dissection for NZIMLS members is open from January 2016 and application forms will be available shortly.

In the meantime for those interested in applying for entry, the criteria is clearly outlined above and expressions of interest can be sent to the NZIMLS, PO Box 505, Rangiora 7440 or email to fran@nzimls.org.nz

Ross Hewett
President, NZIMLS
January 2016

Product News

New Thermo Scientific Medifuge Small Benchtop Centrifuge Provides Versatility Within a Compact Footprint



Clinical and life science researchers can now benefit from a new benchtop centrifuge that features a unique 2-in-1 hybrid rotor that has interchangeable fixed-angle and swinging buckets to facilitate quick and convenient switching between applications.

Rotor exchange can be time-consuming and expensive, particularly for researchers constantly alternating between sample vessels. When coupled with the Thermo Scientific DualSpin rotor, the versatile Thermo Scientific Medifuge small benchtop centrifuge provides the flexibility to perform several applications on a single platform.

The unique 2-in-1-rotor is designed to improve productivity and increase cost efficiencies by eliminating the need to exchange or purchase additional rotors, or even a different centrifuge, to meet the application demands of the lab. The Medifuge centrifuge incorporates safety and environmental sustainability features such as an emergency lid-lock release, in case of power failure; quiet operation at less than 56 dBA; and a lightweight composite rotor that is easy to handle and saves energy during acceleration/deceleration. The compact footprint makes this new benchtop centrifuge an ideal choice for labs with limited space.

The centrifuge is designed for simple operation, and it features a large, brightly lit display with intuitive controls and a fast one-click closure. The four customizable programs allow users to quickly run routine protocols, while three deceleration profiles – standard, soft and brake-off – are designed to provide optimal separation.

The centrifuge can accommodate a wide range of tubes, from 1.4 mL to 15 mL, with two spacer options, including clinical IVD blood tubes, gel tubes, standard syringes and conical tubes. Serum preparation can be done with the swinging buckets, which minimizes contamination risk, while cell pelleting, which often requires low g force, can be performed using the fixed-angle buckets. Researchers can also run both fixed-angle and swinging buckets at the same time for separation.

The Medifuge centrifuge conforms to the latest clinical and safety standards, such as UL, CE and IVD, and is listed with US FDA as a Class 1 device.

More information on the Medifuge small benchtop centrifuge can be found by visiting [thermoscientific.com/medifuge](https://www.thermoscientific.com/medifuge)

Journal Questionnaire

Below are 10 questions based on articles from the April 2016 issue. Read the articles carefully as most questions require more than one answer.

Answers are to be submitted through the NZIMLS web site. Make sure you supply your correct email address and membership number. It is recommended that you write your answers in a word document and then cut and paste your answers on the web site.

The site has been developed for use with Microsoft's Internet Explorer web browser. If you are having problems submitting your questionnaire and you are using the Firefox web browser, try resubmitting using Microsoft's Internet Explorer.

You are reminded that to claim valid CPD points for successfully completing the journal questionnaire you must submit an individual entry. It must not be part of a consultative or group process. In addition, members who have successfully completed the journal questionnaire cannot then claim additional CPD points for reading the articles from which the questions were derived.

The site will remain open until Friday 8th July, 2016. You must get a minimum of eight questions right to obtain five CPD points.

The Editors set the questions but the CPD Coordinator, Jillian Broadbent, marks the answers. Please direct any queries to her at cpd@nzimls.org.nz.

APRIL 2016 JOURNAL QUESTIONNAIRE

1. Oxidative damage to sperm is handled by which reactive oxygen species?
2. Which antioxidant enzymes surround the human sperm?
3. Name three antioxidants that have been shown to be reduced by cryopreservation of human semen.
4. Sperm cryopreservation-thawing leads to alterations in which two mechanisms that enhance the generation of reactive oxygen species?
5. What is the main conclusion of the semen cryopreservation study?
6. Multiple myeloma is a malignant disorder characterized by what, what do they produce, and where are they derived from?
7. Multiple myeloma of the IgD isotype is often accompanied by which clinical features?
8. What is the most common neurological complication of multiple myeloma, and what is its reported incidence?
9. IgD multiple myeloma is characterized by what biochemical features?
10. Laboratory analysis of IgD multiple myeloma cases by serum protein electrophoresis typically demonstrate which features?

November 2015 Journal Questionnaire Answers

1. Which carbapenem antimicrobials are restricted for the treatment of life threatening infections caused by multi-drug resistant Gram-negative isolates?
Ertapenem, imipenem and meropenem.
2. Resistance to carbapenems can also be due to which intrinsic chromosomal mechanisms?
Reduced permeability due to mutations in outer membrane porins and due to up-regulated efflux pumps.
3. Which test has been suggested as a screen to aid detection of OXA-48 producers?
A disk diffusion test utilising both temocillin and piperacillin/tazobactam zone diameters.
4. What are the test principles of the Carba NP and Blue Carba biochemical tests for carbapenemase detection?
Enzymatic hydrolysis of imipenem and subsequent colour change of a pH indicator (phenol red and bromothymol blue respectively).
5. What were the limitations of the Creighton and Jayawardena article?
The limited number of carbapenemase-producing isolates tested and the lack of any isolates harbouring dual carbapenemases, which can interfere with the interpretation of phenotypic tests.
6. What are the biological actions of Panton-Valentin leucocidin cytotoxin?
Destroys white blood cells and causes extensive tissue necrosis and severe infections.
7. What are the risk factors for developing *S. aureus* Panton-Valentin leucocidin cytotoxin?
Overcrowding, skin contact such as close contact sports, and compromised skin integrity, such as eczema.
8. Possibly why is adenoid carcinoma of the breast much less malignant than histologically identified neoplasms of other sites?
Factors such as the relatively small size of these tumours when first noticed in the breast and their location, which enables total excision.
9. What are the histological features of adenoid carcinoma of the breast?
Intercellular cystic spaces lined by basement membrane material and biphasic cellularity with myoepithelial cells intermixed with epithelial cells.
10. The differential diagnosis of adenoid carcinoma of the breast includes which feature?
Reserve cell hyperplasia, where there are sheets of compactly arranged small cells with scant cytoplasm, round nuclei and a high nuclear/cytoplasmic ratio.

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2016 NZIMLS CALENDAR
Dates may be subject to change

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21 May 2016	North Island Seminar, Waipuna Hotel & Conference Centre	rossh@adhb.govt.nz nadiaa@adhb.govt.nz
13-15 May	NICE Weekend, Wairakei Resort	raewyn.cameron@lsr.net.nz natalie.fletcher@sclabs.co.nz
June	Biochemistry SIG Seminar	
18 June	Microbiology SIG Seminar, Dunedin Centre	megan.sullivan@sclabs.co.nz gayleen.parslow@sclabs.co.nz
June	Molecular Diagnostics SIG Seminar	
29 October	Histology SIG Seminar, Waipuna Hotel & Conference Centre	pcoles@adhb.govt.nz
15 October	Haematology SIG Seminar, Waipuna Hotel & Conference Centre	calgie@adhb.govt.nz
01 October	PreAnalytical SIG Seminar, Waipuna Hotel & Conferene Centre	annette.bissett@waitematadhb.govt.nz
November	Immunology SIG Seminar	
12 November	Mortuary SIG Seminar, Whangarei Hospital	bill.little@southerndhb.govt.nz clive.matthews@northlanddhd.org.nz
DATE	NZIMLS EXAMINATIONS	CONTACT
20 May	Applications close for QMLT Examinations	fran@nzimls.org.nz
07 November	QMLT Examinations	fran@nzimls.org.nz
DATE	COUNCIL MEETINGS	CONTACT
19 & 20 May	Council Meeting	fran@nzimls.org.nz
14&15 August	Council Meeting, Rotorua	fran@nzimls.org.nz
18 August	Annual General Meeting, Rotorua	fran@nzimls.org.nz
November	Council Meeting	fran@nzimls.org.nz
DATE	EVENTS	CONTACT
16-19 August	Annual Scientific Meeting, Rotorua	raewyn.cameron@lsr.net.nz joanne.hartigan@lsr.net.nz fran@nzimls.org.nz
DATE	MEMBERSHIP INFORMATION	CONTACT
17 June	Nomination forms for election of Officers and Remits to be with the Membership (60 days prior to AGM)	fran@nzimls.org.nz
15 June	Material for the August Journal must be with the Editor	rob.siebers@otago.ac.nz
7 July	Nominations close for election of officers (40 days prior to AGM)	fran@nzimls.org.nz
27 July	Ballot papers to be with the membership (21 days prior to AGM)	fran@nzimls.org.nz
3 August	Annual Reports and Balance Sheet to be with the membership (14 days prior to AGM)	sharon@nzimls.org.nz
10 August	Ballot papers and proxies to be with the Executive Officer (7 days prior to AGM)	fran@nzimls.org.nz
15 September	Material for the November Journal must be with the Editor	rob.siebers@otago.ac.nz

