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Connections

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CMPT and POLQM and International Outreach

Clinical Microbiology Proficiency Testing and its sister program: Program Office for Laboratory Quality Management, have for many years had a positive international profile. In part, that derived from working collaborations with the US Centers for Disease Control, the World Health Organization, the Saudi Quality Council, the International Organization for Standardization and our own Standards Council of Canada. CMPT has a twenty year record of bringing people from around the world to Vancouver to provide them with EQA training.

Over the last few years, we have participated with the International Training and Education Center for Health (I-TECH) through its center at the Department of Global Health, University of Washington.

I-TECH, a collaborative program between the University of Washington and the University of California, San Francisco, started in the 1990s and is now a multinational program with over 600 staff working in Africa, Asia, and around the world providing guidance and training in Health Leadership and Management, Health Systems Strengthening, Health Workforce Development, Implementation Science and Evaluation and Prevention, Care, and Treatment of Disease.

Working towards laboratory strengthening, UBC has been working with I-TECH through our two programs which have been providing quality management training and assistance with proficiency testing.

In the summer of 2017, Dr. Noble joined the I-TECH team lead by Dr. Lucy Perrone in Lusaka, Zambia participating in a kick-off workshop to introduce the attendees to Quality Management principles. We continued to provide our 21-week on-line course for 15 Quality Assurance Officers in Zambian medical laboratories, ending in early December. It was a tremendously successful exercise with learning on both sides.

International Outreach

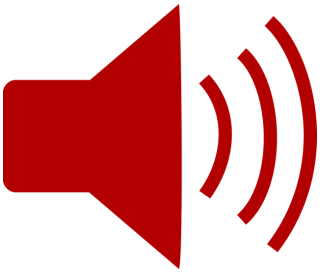
While laboratory and quality management principles are largely universal, they have to accommodate to regional specifics. One would be hard pressed to describe Zambia with archaic terms such as "resource limited", or "developing", but it certainly is evolving. It is clear from the Ministry of Health that there is a clear and specific mandate for laboratories to move towards international standards for medical laboratory quality and competence. We are very excited to have the opportunity to work with them towards that goal and it is pretty clear they are interested in working with us.

In 2018, we started working on a similar program with the Ministry of Health in Cambodia with a workshop held in Siem Reap, a young (1500s) thriving city in an ancient land with a mixture of French, Hindu, and Buddhist cultures. The workshop was held for 24 Quality Assurance Officers and Laboratory Managers from hospitals throughout Cambodia. There are strong ties with the United States, and English is a "common" second language but the primary language is Khmer, which created the necessity of providing the workshop through the aid of simultaneous translation. It was not perfect, but all-in-all, the key messages were communicated and well received.

In collaboration with additional partners, we have been asked to start training certain central laboratories in Cambodia and in Africa to develop their own microbiology proficiency testing programs. While governments are increasingly aware of issues of antibiotic resistance through One-Health programmes (combined programs for animal and human care), authorities cannot get a grasp on the levels of local resistance without having information and that means that local medical laboratories have to improve their services. Implementing both quality management and local EQA programs will play a big part in the evolution of laboratory change.

CMPT and POLQM are excited to have the opportunity to participate in these programs as we broaden our education, research, and outreach to wider parts of the medical laboratory world.

What is Alert Ready?



Alert Ready is designed to deliver critical and potentially life-saving alerts to Canadians through television and radio to ensure people receive alerts immediately and know when to take action to keep safe.

Starting on April 6, 2018, Alert Ready will be sending alerts regarding life-threatening emergencies to cell phones and wireless devices that are compatible with Wireless Public Alerting (WPA).

More information can be fount at the Alert Ready website: https://www.alertready.ca/

Biotin Supplementation and Laboratory Interference: An Unintended Consequence in the Pursuit of Beauty

By Sophia L. Wong and Morris Pudek

Vitamin B7, more commonly known as biotin, is a water-soluble vitamin that functions as a coenzyme for carboxylase reactions. With a recommended dietary reference intake (DRI) of 30 µg/day, biotin supplementation is seldom indicated in healthy individuals, as biotin is found in various foods, including eggs, fish, meat, cauliflower, spinach, and avocado. Biotin in daily doses of 5-30 mg may be prescribed in certain inborn errors of metabolism, such as biotinidase deficiency or propionic acidemia.

More recently, megadoses up to 300 mg/day have shown promise in research studies to improve symptoms in patients with secondary progressive multiple sclerosis [1].

In the past several years, biotin supplementation has exploded in popularity as a beauty tool marketed to enhance hair, skin, and nail growth, although limited evidence exists to support such claims. A survey conducted in our outpatient laboratory at Vancouver General Hospital found up to 10% of the local population to be on biotin supplementation.

Biotin is non-toxic, even at large doses, and excess quantities are cleared by the kidneys. Although high levels of biotin are not harmful physiologically, they may compromise the results of laboratory tests which employ biotin-streptavidin technology. Biotin-streptavidin binding is commonly found in immunoassays due to its avidity, sensitivity, specificity, and stability. A broad range of tests, such as those used in the diagnosis and/or monitoring of cardiac disease, endocrinopathies, malignancies, anemias, autoimmune and infectious diseases, may be affected by biotin.

Much variability exists in the magnitude and direction of interference: in competitive immunoassays (e.g. for measurement of small molecules, such as free thyroxine [FT4] or free triiodothyronine [FT3]), the assay signal is inversely proportional to the analyte concentration. Biotin reduces the signal and leads to spuriously high results (Figure 1A), which might be inadvertently interpreted as an indication of hyperthyroidism.

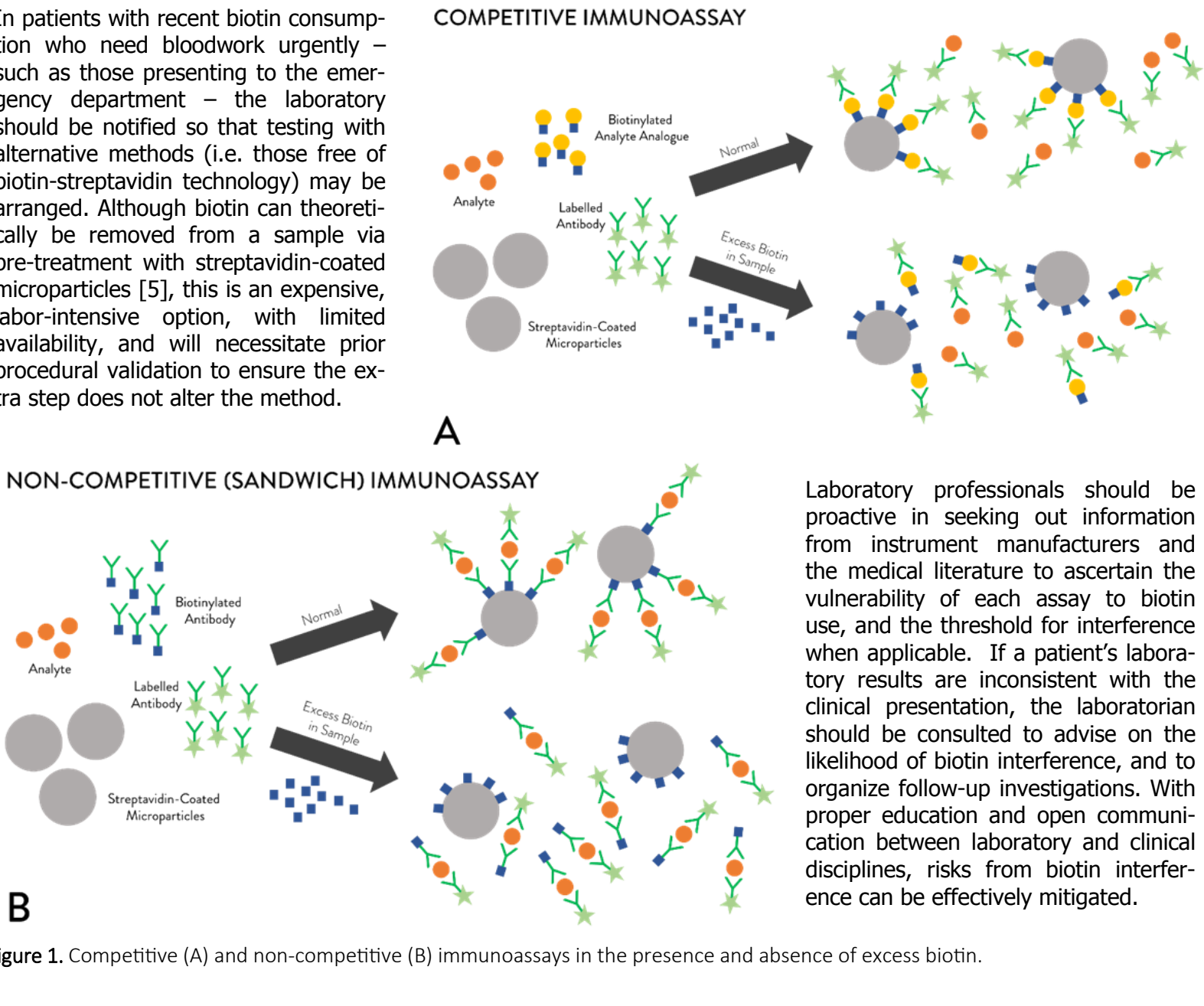
In non-competitive, or sandwich, immunoassays (e.g. for measurement of larger molecules, such as thyroid-stimulating hormone [TSH] or cardiac troponin), supplemental biotin competes with biotinylated complex for binding to regent streptavidin-coated beads, decreasing the assay signal and causing factitiously low results (Figure 1B), which would also be consistent with a false indicator of hyperthyroidism. A number of cases have surfaced in the medical literature describing apparent biochemical thyrotoxicosis/Graves' disease from biotin use [2,3].

> Given the potential for significant patient harm, it is vital that health care providers and patients be well-informed on the effect of biotin on laboratory tests.

The US Food and Drug Administration (FDA) has also issued an alert following an increase in reported adverse events from biotin interference with laboratory tests, including one death following a falsely low troponin result (troponin **is** released when the heart muscle has been damaged, such as a heart attack. The more damage there is to the heart, the greater the amount of **troponin** there will be in the blood).

Given the potential for significant patient harm, it is vital that health care providers and patients be well-informed on the effect of biotin on laboratory tests. As part of history-taking, physicians should regularly inquire whether a patient is taking over-the-counter supplements, including biotin, and to advise that the patient refrain from biotin use for at least 1 day before a blood test is performed, or up to a week if taking very high doses. The half-life of biotin depends on a number of factors, including the dose, the duration of biotin use, and the patient's kidney function. For a single dose of 600 µg, the half-life of biotin has been reported as <2 hours in individuals with normal renal parameters. In contrast, the half-life varies between 8 and 19 hours when a single dose between 100 mg and 300 mg is ingested [4].

In patients with recent biotin consumption who need bloodwork urgently – such as those presenting to the emergency department – the laboratory should be notified so that testing with alternative methods (i.e. those free of biotin-streptavidin technology) may be arranged. Although biotin can theoretically be removed from a sample via pre-treatment with streptavidin-coated microparticles [5], this is an expensive, labor-intensive option, with limited availability, and will necessitate prior procedural validation to ensure the extra step does not alter the method.



Laboratory professionals should be proactive in seeking out information from instrument manufacturers and the medical literature to ascertain the vulnerability of each assay to biotin use, and the threshold for interference when applicable. If a patient's laboratory results are inconsistent with the clinical presentation, the laboratorian should be consulted to advise on the likelihood of biotin interference, and to organize follow-up investigations. With proper education and open communication between laboratory and clinical disciplines, risks from biotin interference can be effectively mitigated.

Figure 1. Competitive (A) and non-competitive (B) immunoassays in the presence and absence of excess biotin.

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Thank you Dr. Diane Roscoe

After 24 years of serving on the CMPT Clinical Bacteriology Committee we are saying good-bye to Dr. Roscoe, at least for the time being. Dr. Roscoe, in her own style, has been a thought provoker on the committee, sitting back and listening, only to quietly pose the always correct piercing central question, resulting in the appropriate pause and rethink and an adjusted committee decision. Over the years Diane has created more than 50 critiques for CMPT which has been a huge impact on the education and outreach value of CMPT.

Congratulations to Diane on her decision to move to Qatar. Perhaps we will see her again at CMPT, maybe as an at-distance contributor.

Mike Noble

Dr. Diane Roscoe

My affiliation with CMPT goes back to about 1994, and I really can't imagine my professional life without it. Over these many years CMPT has offered me the opportunity to collaborate with and learn from so many knowledgeable (and really nice) people as we discussed – and sometimes energetically debated!– the issues. I have been so impressed with what CMPT has accomplished and the leadership CMPT provides-locally, nationally, and globally – to advocate for quality in Laboratory Medicine. I have been honoured to be a part of CMPT and proud to say so. Of course, you can't talk about the impact of CMPT without mentioning Mike Noble – he gave me my first position in Vancouver, even before my membership on the Bacteriology Committee, and happily our careers have been intertwined ever since. Thank you Mike and thank all of you who have helped me contribute to laboratory quality. I will miss being part of such an amazing organization.

D. Roscoe

I've had the pleasure of knowing Diane for 27 years, and we've worked together most of those years in the laboratory and at CMPT, where she was a committee member of the Clinical Bacteriology program.

She has a generous spirit and has shared her wealth of microbiology knowledge to the healthcare community and especially to CMPT.

CMPT has benefited greatly from her 24 years of participation, with her unique insight, enthusiasm, humour and invaluable support, she has been a very good friend to our program. We've shared many memorable moments (sometimes at opposing sides of tennis matches), and I will miss her personally and her presence on the committee.

On behalf of CMPT and the committees, I wish her new adventures and all the best in her new life in Doha, Qatar!

Esther Kwok

Upcoming Events

May 2018

CSMLS Labcon 2018
May 25-27 Ottawa, ON
More info: https://labcon.csmls.org/

June 2018

ASM Microbe
June 7-11 Atlanta, GA
More info: https://www.asm.org/index.php/asm-microbe-2018/atlanta

September 2018

Conference on antimicrobial resistance from bench to practice

September 26 - 27 Havana, Cuba
More info: Conference's website link

October 2018

POLQM October Conference: Improving Laboratory Culture is not ONLY a microbiology imperative
October 2018 Vancouver, BC
Details to follow

ABOUT CONNECTIONS

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