



Diagnosing Allergy

the "allergy march" as it follows a given pathway after the first atopic immune response has occurred (atopy is defined as a personal or familial tendency to produce IgE antibodies in response to low doses of allergens).

Routine diagnostic testing plays a vital role in confirming the atopic state, identifying the specific cause, and mapping out the likely route of the allergy march and thus the most effective management strategy.

Clinicians may be used to requesting and interpreting the measurement of specific-IgE tests as the classical radioallergosorbent test (RAST) however this method of testing is no longer employed in Canada. Although often still referred to as a RAST test, it has been replaced with a more sensitive technique utilizing a solid phase immunoassay platform developed by Pharmacia Diagnostics called the ImmunoCAP™ system.

Pharmacia Diagnostics has long been recognized as the pioneer and world leader in allergy testing with their simple and reliable in vitro allergy tests for IgE, IgG, and IgA antibodies. In 1986 they developed Phadiatop®, a simple Yes/No test for inhalant allergy that answered the need of GP's wanting to know if a patient's allergy like symptoms were actually due to allergy or to some other cause. Today,

ImmunoCAP™ Phadiatop® acts as an exceptional front line screen for inhaled environmental allergens, including pollen from trees, grasses and weeds. ImmunoCAP™fx5 screens for the most common childhood food allergens. These diagnostic tools quickly identify or rule out atopic patients and help to support/direct further testing or management. The ImmunoCAP™ system also provides for testing of over 450 individual allergens in addition to tests for diagnosing autoimmunity and monitoring asthma.

In comparison to traditional in vivo skin prick testing that requires specialist resources, interpretation and risks a potentially dangerous response to allergen exposure, there is great value for our medical laboratory services to provide routine, easily accessed, highly sensitive and specific allergy testing utilizing a simple blood test to help support our practitioners in the identification and management of patient allergy. Further information on Pharmacia's ImmunoCAP™ system and their full menu of their allergens is available through Somagen Diagnostics.

- (1) The Canadian Allergy, Asthma and Immunology Foundation.
 (2) Quality and Accreditation of Allergy Testing, Mario Plebani, Department of Laboratory Medicine, University of Padova, Italy

Allergies influence the well being of 30-35% of all Canadians. Asthma affects 15-20% of our population and is responsible for hundreds of deaths in Canada. Food allergies affect 5-10% of Canadians, hay fever 20-25%, eczema 10% and anaphylaxis (a severe allergic reaction that can kill) affects 1-2% of our population. (1) On the basis of these considerations alone, there is a need to better understand the genetic and molecular nature of these diseases, as well as to better address the role of laboratory medicine to improve the diagnosis and management of allergic patients.

The Allergy March:

When a young child first develops symptoms such as eczema and breathing difficulties, it has embarked on what may well be a lifelong disposition to allergy. This progressive development of allergy is called

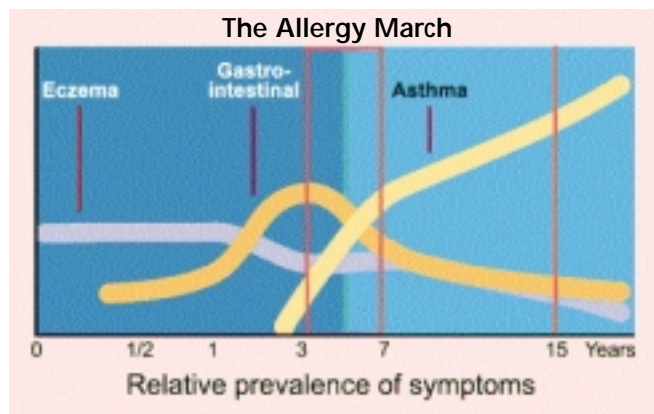


Fig. 1. Prevalence of allergic symptoms related to age. Eczema is the first symptom in the youngest age group, followed by gastrointestinal symptoms and respiratory tract symptoms, which often first appear as wheezing.



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Same day diagnosis of surgical specimens

Anatomical Pathology is the place where science, art and the expertise of the Pathologist meet for interpretation, diagnosis and prognosis of disease. It typically requires in excess of 24 hours to complete the procedure and involves many steps with many hands. Building on a vision that surgical specimens processed and reported within the same day would result in faster diagnosis and overall better management of both patients and the expenditure of health care dollars, a new and innovative direction for the pathology laboratory was conceived, developed, tested and is now available for the Canadian Histopathology laboratory.

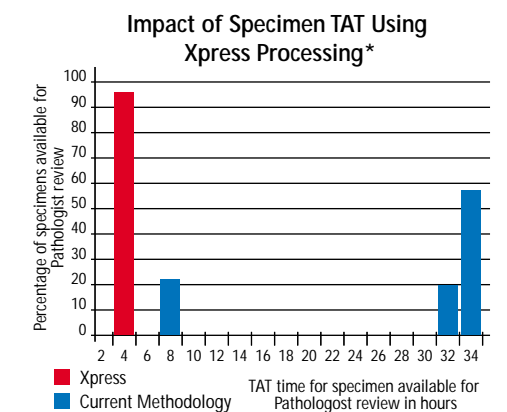
Xpress™ Rapid Tissue Processor

The new Sakura Xpress™ tissue processing system achieves this vision by combining patented low wattage microwave and traditional vacuum technologies along with a complimentary reagent system. The Xpress™ has a through put of 120 specimens in one hour with continuous loading of up to 40 cassettes every 15 minutes. The Xpress™ can manage a volume of up to 900 cassettes in an eight hour shift in a completely closed system that also limits the exposure of the laboratory



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staff to hazardous reagents. This new processing method uses a blend of gentle reagents that allow for faster more efficient fixation, dehydration, clearing and impregnation. The Xpress™ permits Pathologists to work mere hours behind the Surgeon resulting in up to 70% faster reporting capabilities.



This graph dramatically demonstrates the impact of reduced processing time coupled with the ability to continuously load specimens eliminating the restrictions associated with batching workloads as is currently required.

*statistics collected Nov. 2003 from Canadian Pathology Laboratory processing 420 blocks per day. Data analysis available from Somagen Diagnostics.

Benefiting from Reagent Reduction

Conventional processing requires the use of highly toxic reagents such as formalin and xylene, both well documented as hazardous and noxious. In addition to a reduction in the overall volume of the reagent requirements of the Xpress™ by more than

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Monitoring Maternal and Fetal Health

Women with a risk above a specified level are classified as positive on screening and are offered a definitive diagnostic test of either amniocentesis or chorionic-villus sampling. The use of biochemical tests can reduce or eliminate the risk of other forms of fetal testing.

Prenatal screening for Down Syndrome is an important component of maternal and fetal health. Screening at most facilities until recent times has consisted of three markers tested for in the mother's serum. Serum alpha-fetoprotein (MSAFP), human chorionic gonadotrophin (hCG) and unconjugated Estriol (uE3). Recent research has demonstrated that adding Inhibin A, as a fourth marker to the screening process improves detection from 69% to 76% without changing the false positive rate of 5%.

In Down Syndrome, for the duration of the pregnancy the levels of AFP and uE3 are reduced while the hCG level is increased compared with the levels of non-affected babies. Levels of Inhibin A increase and remain elevated after 10 weeks when normally they should decline.

In 1986 the association between low maternal serum AFP and fetal aneuploidy in the first trimester was reported. Other

Maternal Age (Years)	Risks
20	1:1528
25	1:1351
30	1:909
35	1:385
40	1:112
45	1:25

serum markers have also been studied, such as pregnancy associated plasma protein A (PAPP-A), several studies have confirmed that PAPP-A is low (approx. 60%) in first trimester pregnancies affected by Down syndrome.

Somagen Diagnostics is proud to exclusively offer Inhibin A and PAPP-A, from Diagnostic Systems Laboratories, Webster Texas, to its Canadian customers in the business of Maternal Serum Screening. There is no sample pre-treatment in the straight forward protocols which also offer the flexibility of automation or manual procedure.

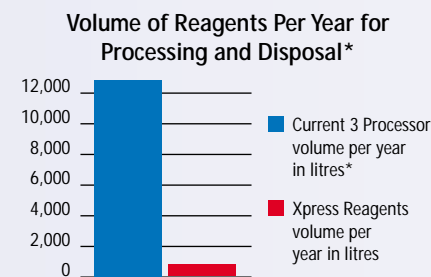
References:

- 1) SOGC Clinical Practice Guidelines No.105, June 2001
B.N. Chodirker, et al
- 2) Second Trimester Maternal Serum Screening Programmes for the Detection of Down's Syndrome. Geneva Foundation for Medical Education and Research
Arben Paralloi, et al.
- 3) The ABCs of Inhibins & Activins DSL Advancing Diagnostics, available from Somagen Diagnostics, Edmonton, Alberta
- 4) Screening for Chromosomal Anomalies: First or Second Trimester, Biochemical or Ultrasound? CPD Paper C.H. Rodeck Royal Free and University College Medical School University College London, Department of Obstetrics and Gynaecology London

Trisomy 21 (Down Syndrome) is the most common serious autosomal chromosome aberration in which affected individuals survive beyond birth and infancy. The severity of the syndrome includes mental retardation, congenital cardiac malformation, disorders of the immune system, gastro-intestinal malformations and slow physical development.

Prenatal screening for Trisomy 21 (Down Syndrome) and other chromosomal abnormalities involves the estimation of risk of having an affected pregnancy on the basis of factors such as maternal age, maternal serum concentrations of various analytes and ultrasound measurements.

Same day diagnosis of surgical specimens... cont'd



This graph displays the decrease in reagent with the Xpress™ system resulting in dramatically reduced reagent management, decreased disposal requirements, and decreased toxin exposure. Ergonomics are further supported by the convenient Xpress™ reagent containment system.

*statistics collected Nov. 2003 from Canadian Pathology Laboratory processing 420 blocks per day. Data analysis available from Somagen Diagnostics.

80%, the toxicity of tissue processing has been significantly reduced with the elimination of both formalin and xylene.

Molecular Studies

An added advantage of the new Xpress™ reagent system is the ability to preserve DNA and RNA. The novel Universal Molecular Fixative from Sakura prevents the destruction of macromolecules while providing fixation rates similar to formalin and when combined with the Xpress™ processing, results in a paraffin block in which DNA and RNA are still intact. Retrieval of DNA and RNA from paraffin embedded tissues allows for stable long term storage for the tissues and now the same block can also provide for future genetic studies. This is a true advancement in the histological potential for patient lifetime disease management and investigation.

Supporting Laboratory Staff

Utilizing the Xpress™ high volume rapid processor, workload management becomes very shift friendly as the same volume of work that was traditionally completed in a 24- hour period will now take a regular day shift. Automation that contributes to removing redundancy and routine and repetitive tasks will free up technologists to utilize their skills more effectively. Moreover working with the newest technologies and scientific developments in the industry contributes to a stimulating work environment and ultimately career satisfaction.

The Xpress™ Rapid Tissue Processor will be displayed at the upcoming National Society of Histology meeting in Toronto September 18 – 22. For more information on rapid tissue processing or the NSH please contact Somagen Diagnostics.

Urinalysis under the Microscope

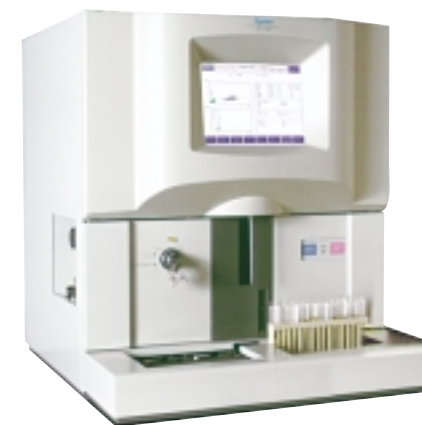
Urinalysis has been called the single most valuable test of the anatomic integrity of the kidney that is readily available to the clinician. The kidney itself is one of the only organs for which there exists a non-invasive means to directly evaluate its status. The Canadian Institute for Health Information has reported over 47, 000 patients have been treated for end stage renal disease since December 31, 1999 - urinalysis will most certainly remain significant in managing these and other patients.

Urinary microscopic analysis however, has remained virtually unchanged since the methodology was developed and described by Dr. Addis in 1925⁽¹⁾. As one of the last frontiers in the movement of automation and standardization in the laboratory it continues to involve tedious work and manual techniques which lack reliable control measures and can result in very subjective interpretation and poor reproducibility.

To this end, enter the Sysmex UF 50 and UF100 - automated systems that have

streamlined, standardized and increased the sensitivity of urine particle analysis. Utilizing flow cytometry similar to hematology analyzers to measure cell numbers, forward scatter signals to classify cells by size and 2 flouochromes to differentiate urinary formed elements based on the content of nucleic acid and membranous material, this automated system can read from 50 – 100 urine samples per hour. Abnormal or suspicious specimens are identified by laboratory determined “flags” which then allow for the review of clinically significant specimens using the trained and most effective skills of the technologist.

The UF series measures “native” urine which is not subject to the variables associated with centrifuging specimens



which can alter, damage or interfere with the true cellular content of the sample or capture questionable amounts of cellular components in the supernatant. Scattergram readings on the UF provide a permanent snapshot of the specimen analysis and can be interpreted to determine cell types beyond the traditional report.

As automation makes the laboratory more efficient, it also serves to remove the frustration factor associated with redundant tasks and time wasted on negative and undisputedly “uninteresting” microscopy work that does not require the level of expertise that is expected of today's laboratory professionals. In addition it allows for quality control measures that did not exist with manual methods. Now the laboratory can perform day-to-day intra-assay checks on precision and accuracy.

As with any manual test, each step in the test process adds variability, yielding results that are subjective and imprecise. With better technology, we can challenge the old paradigm of reporting subjective and difficult to control techniques to standardized, controlled analysis that will create a reproducible and true reflection of the patient status.

Reference:

- 1). Addis, T. (1925). JAMA, 85,163.

Included in Somagen's commitment to education and support of our health care partners is participation and exhibition at professional meetings. We look forward to seeing you at any of the following upcoming meetings:

OPTMQ: Congres 2004 De L'Ordre Professionnel des Technologistes medicaux du Quebec	May 27 – 29	St-Jean-Sur Richelieu, PQ
AMMIQ: Association des medecins microbiologistes infectiologues du Quebec	June 2 – 4	Lac Delage, PQ
CSPS: Canadian Symposium on Prenatal Screening	June 4	Toronto, ON
CSCC: Canadian Society of Clinical Chemists	June 5 – 10	London, ON
CSMLS: Canadian Society of Medical Laboratory Science	June 14 – 16	Saskatoon, SK
CSP: Canadian Society of Pediatricians	June 17	Montreal, PQ
SABR: Somagen Diagnostics Scientific Advisory Board Retreat	June 14 – 16	Banff, AB
SOGC: Society of Obstetricians and Gynaecologists of Canada	June 24 – 29	Edmonton, AB
FOCIS: Federation of Clinical Immunology Societies	July 18 – 22	Montreal, PQ
AACC: American Association of Clinical Chemists	July 25 – 29	Los Angeles, California
Society for the Study of Reproduction	July 31 – Aug 4	University of British Columbia, BC
National Society of Histology	Sept 18 – 20	Toronto, ON

See you at the Fair



Leanne Friesen and Tony Ehret, Somagen TM's at CHICA Canadian Hospital Infection Control Association (CHICA) – May 3-4, Calgary AB