

# ASCLS 2002 Annual Meeting: Official Abstracts of Submitted Papers and Posters

ORLANDO, FLORIDA  
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The following abstracts have been accepted for presentation at the 2002 American Society for Clinical Laboratory Science (ASCLS) Annual Meeting and Clinical Laboratory Exposition to be held July 30 through August 3, 2002 in Orlando, FL. The meeting program was published in the Spring 2002 issue of *Clinical Laboratory Science*. Abstracts are reviewed by appropriate representatives of the ASCLS Scientific Assembly Sections. They are the final authority in selecting or rejecting an abstract.

Papers and posters will be presented during the following times at the annual meeting. Room assignments will be listed in the final program.

## POSTER PRESENTATIONS

Orange County Convention Center

Wednesday, July 31, 2002 and Thursday August 1, 2002, 10:00 A.M. – 4:30 P.M.

*Authors will be present Thursday, August 1, 2002 from 10:00 A.M. to 11:00 A.M. to discuss their poster.*

## CASE STUDY PRESENTATIONS

Sheraton World Resort

Friday, August 2, 2002, 10:15 A.M. – 11:45 A.M.

Interdisciplinary Case Study Presentations (#33)

## RESEARCH PAPER PRESENTATIONS

Sheraton World resort

Friday, August 2, 2002, 2:15 P.M. – 5:30 P.M.

Interdisciplinary Case Study Presentations (#38)

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*The peer-reviewed Clinical Practice section seeks to publish case studies, reports, and articles that are immediately useful, of practical nature, or demonstrate improvement in the quality of laboratory care. Direct all inquiries to Bernadette Rodak MS CLS(NCA), CLS Clinical Practice Editor, Division of Medical Technology, I.U.P.U.I., Fesler 409, 1120 South Avenue, Indianapolis, IN 46202-5113.; or send e-mail to brodak@iupui-edu*

## POSTER PRESENTATIONS

### Accreditation Services, Which Meets Your Laboratory Needs?

Natalie Evans Wallace, Raelene Perfetto MBA, Sharon Cherie, The Johns Hopkins Hospital, Baltimore MD.

All laboratories that perform moderate and /or high complexity testing must be surveyed every two years according to the Clinical Laboratory Improvement Act. A number of choices are available for compliance or accreditation of laboratories that are recognized by the Center for Medicare and Medicaid Services. Each laboratory must decide which service will best meet the needs of their organization to meet compliance. Initially the cost of each service is considered; however, there are other factors that may influence a decision as to which service may best meet a laboratory's needs. The size of the laboratory as well as the test volume and number of specialties involved may influence the decision. The object is to obtain the best value for the compliance or accreditation service. The Continuous Quality Improvement Office researched the options available to laboratories in the USA. 100 laboratories were surveyed to find out how small (<500,000 test volume) and large laboratories (>500,000 test volume) decide what is most important to them in deciding on an accreditation organization for compliance. The study compares which accreditation organizations are chosen and why. The value is based upon resources provided by the accreditation organization, for example, continuing education, seminars, publications, and survey process, and how many were utilized. It is up to each laboratory to choose the best service that meets its needs.

### A Clinical Approach to the Development of a Science Teacher Course

Brenda L Bouchard MS, University of Massachusetts, Dartmouth MA.

The Medical Laboratory Science (MLS) Program at the University of Massachusetts in Dartmouth (UMD) developed a science content course for the Masters of Arts in Teaching (MAT) Program of the College of Arts and Sciences. As part of a UMD Collaborative Curriculum Committee, the MLS Department offered a course with an emphasis on life sciences and laboratory techniques. The key academic concepts of the course were aligned with the Massachusetts Department of Education Science, Technology and Engineering Frameworks, and the National Performance Standards for Teachers. Instructional strategies for the course integrated

differential learning methods, multiple intelligences theory, and cooperative learning. The topics of the course included laboratory safety, manual cell counts, introduction to instrumentation, coagulation testing, and spectrophotometry. The 45-hour, 3-credit graduate course is offered during the UMD summer session. The concepts and skills acquired from this course prepare educators for the incorporation of pedagogy and laboratory techniques in the science classroom.

### Clinical Value of D-Dimer Determination in Spinal Cord Injury

Patricia von Arx Burger MS, Ulrike Petri MD, Hans Knecht MD, Swiss Paraplegic Centre, 6207 Nottwil Switzerland.

Endothelial fibrinolytic activity is altered in spinal cord injury (SCI). Therefore in para- and tetraplegics (quadriplegics) baseline levels of D-dimers may be elevated compared to healthy pedestrians. To answer this hypothesis we prospectively tested 100 patients (44 para-, 38 tetraplegics, 18 pedestrians) hospitalized at our national center. D-dimers (Roche COBAS INTEGRA Tina-Quant, immuno-turbidimetric) and C-Reactive-Protein (Roche COBAS INTEGRA CRP immuno-turbidimetric) were determined within 24 hours after admission. D-dimer levels were normal (<0.5 mg/mL) in 42, moderately elevated (0.5-2.0 mg/mL) in 32 and high (>2.0 mg/mL) in 26 patients. The combination of elevated or high D-dimer levels (>0.5 mg/mL) but normal CRP-level (<= 5 mg/L) was identified in 16 patients (five para-, seven tetraplegics and four pedestrians). In 11 of these an inflammatory but non-infectious concomitant disorder explained the elevated D-dimers. In the remaining five patients only adiposity (three paraplegics, one pedestrian) and congenital spinal muscle atrophy (one tetraplegic) were diagnosed. Our results show that in SCI, baseline D-dimer levels of non-adipose patients correspond to a healthy control population.

### Comparison of Five Methods in the Diagnosis of Acute *Chlamydia pneumoniae* Infection

Mika Paldanius MSc, Maija Leinonen PhD, Pekka Saikku MD, National Public Health Institute, University of Oulu, Oulu Finland.

*C. pneumoniae* causes respiratory tract infections with variable severity. Diagnosis of acute infection is based on demonstration of antibody responses between paired sera, and microimmunofluorescence (MIF) is considered the gold standard. Our aim was to compare five serological tests in the diagnosis of acute infection in 122 patients with pneumonia. *C. pneumoniae*-specific IgG, IgA, and IgM antibodies were measured by in-house MIF, commercial MIF (Thermolabsystems, Finland), and two EIA methods (Thermolabsystems and Savyon, Israel) and chlamydial LPS antibodies by rELISA (Medac, Germany). Diagnosis was based on

four-fold titer rise between paired sera or presence of IgM in MIF tests. Diagnostic criteria for EIA tests were based on kit instructions. Diagnostic findings were obtained in 47 cases by at least one and, in 27 cases, by at least two tests, which were considered as the reference. In-house MIF (59%), Savyon (56%) and Labystems EIAs (55%) were more sensitive than commercial MIF (48%) and rELISA (48%). Specificity varied from 93% to 98%. Positive predictive values were 80% for in-house MIF, 72% for commercial MIF, 68% for Labystems EIA, 88% for Savyon EIA, and 87% for rELISA. Negative predictive values varied from 87% to 89%. The strength of the agreement measured as k-values were good for in-house MIF (0.61) and Savyon EIA (0.62), moderate for Labystems EIA (0.52), commercial MIF (0.49), and rELISA (0.55). The choice of method affects diagnostic findings.

### Comparison of Refractometer and Multistix® 8 SG Reagent Strip for Urine Specific Gravity Measurements

Bergljót Halldórsdóttir (NCA), Margrét Árnadóttir PhD, Örn Ólafsson PhD

Until this study the refractometer was used for the analysis of urine specific gravity in our laboratory. The purpose of this study was to assess to what extent the refractometer measurements could be replaced by the Multistix, 8 SG reagent strip. In the study, 526 routine morning urine samples were analyzed with both the refractometer and the Multistix, 8 SG reagent strip. The results for each sample were evaluated. In 76% of the samples the difference was  $\leq 0.005$ . In 20% of the results showing a difference greater than 0.005, the refractometer measured a higher specific gravity than the Multistix, 8 SG reagent strip. Maximum correlation was obtained between these two methods when the urine showed low specific gravity but discrepancy increased as the urine became more concentrated. These results suggest that Multistix, 8 SG can replace the refractometer for urine specific gravity measurements.

### Comparison of Two Methods for the Laboratory Diagnosis of *Cryptosporidium*

Shirematee Baboolal, Mphil, BHSc, FMT, MT, Caribbean Epidemiology Centre, Port of Spain, Trinidad and Tobago.

The objective of this study was to compare the efficacy of two tests for the laboratory diagnosis of *Cryptosporidium*. The traditional acid fast stain is the gold standard used in laboratories for the diagnosis of *Cryptosporidium*; however, due to the difficulties encountered in processing, staining, and microscopy, infections may be missed. In addition, when intact oocysts were not being shed, as in the case of early or late infections, infections were also missed. In this study, stool samples were collected from patients with and without diarrhea. Acid fast stain (modified Ziehl Neelsen stain) and an ELISA antigen detection test were used. Of the 263 samples

tested 7 (2.7%) were positive by the acid fast method while 18 (6.8%) were positive by the antigen detection method. All positives were obtained from the diarrheal stool samples. This study therefore showed that the ELISA detection test was three times as sensitive as the acid fast stain. Comparative data on the etiologic agents responsible for diarrhea in children revealed that *Cryptosporidium* may be one of the leading causes of diarrhea in Trinidad; however in order to accurately estimate the prevalence, medical laboratories must establish and institute a testing algorithm for *Cryptosporidium*.

### Detection of Chromosome Aberrations in Archival Formalin-fixed Autopsy Material by Fluorescence in Situ Hybridization

Borgny Ytterhus, Eli Johannesen, Norwegian University of Science and Technology.

The possibility to perform classical chromosome studies on spontaneously aborted fetuses and infants suffering an intrauterine death is limited due to lack of viable cells. Detection of chromosome aberrations in archival formalin-fixed material is possible by fluorescence in situ hybridization (FISH). FISH is a molecular cytogenetic technique which allows detection of specific numerical and structural chromosome aberrations in interphase nuclei. Paraffin-embedded tissue from autopsies of fetuses and infants with congenital anomalies suggestive of trisomy 18 were subjected to chromosome enumeration by FISH. To enable identification and enumeration of chromosome aberrations, released whole nuclei from thick paraffin sections were hybridized with a chromosome specific centromere DNA-probe. The hybridization with a chromosome 18-specific centromere DNA-probe was successful, and gave clear signals in over 95% of the nuclei in 9 of 10 cases. The success of FISH on formalin-fixed and paraffin-embedded autopsy tissue was made possible by the choice of enzyme treatment for releasing nuclei and the availability of specific centromere DNA-probes. This analysis contributes to a better quality of perinatal autopsies and is helpful in parental counseling.

### Detection of Novel Mutations in Mitochondrial DNA in Leber's Hereditary Optic Neuropathy Using non RI Single Stranded Conformation Polymorphisms

Yuko Toyo-oka, Harumi Yamabe, Masato Wakakura MD, Tohru Akahoshi MD. Kitasato University Hospital, Sagami-hara, Kanagawa Japan.

Leber's hereditary optic neuropathy (LHON) is a maternally-inherited acute visual loss that predominantly affects young men, and is linked to mutations in mitochondrial DNA (mtDNA). We applied PCR-non RI single stranded conformation polymorphisms (SSCP) screening to investigate gene mutations causing LHON,

and found two novel mutations. Seven primer pairs covering six subunits (ND1, ND4, ND6, ATPase 6, CO3, and CYTB), in which mutations were reported previously, were designed and the PCR-non RI SSCP screening was performed. The direct sequencing was performed on patients with band differences from wild type. In 300 Japanese suspected LHON patients, we detected one case of G8998C and two cases of G9025A mutations in ATPase 6 gene, as well as 50 cases of G11778A mutation in ND4 which is more frequent in Japanese patients. The mutations of G8998C and G9025A deduce Val158Leu and Gly167Ser, respectively. These two novel mutations cause alteration of highly conserved amino acids, indicating that they may represent the pathogenetic role in LHON. This paper also demonstrates that the PCR-non RI SSCP screening is a powerful technique to use for the identification of polymorphisms and mutations in multiple DNA sequences including mtDNA.

### Digital Video Examination of Urinary Sediments

Robert Sullivan, Marist College, Poughkeepsie NY.

Teaching the microscopic examination of urine sediments with patient samples is limited to the availability of appropriate, labile material. The alternative is to use static, flat, single views in 35 mm. slides, or CD-ROMS. This project mimics photographically what is seen through a microscope and presents a dynamic view of samples. Sediments were viewed through a binocular, light microscope using a TeachCam from Video Labs, Inc, with 8 mm optics and a 291K pixel count. The video feed was transmitted to a SVHS recorder for maximum resolution. The videotapes were digitized and processed through an AVID Computer based non-linear video editing system. The final formats were on VHS videotape and CD-ROM. Each specimen is presented with changes in focus and fields. Each sample is presented unstained and stained, and appears under low and high power. There are six discrete segments that allow viewing of selected elements. The video is accompanied by a narrative describing the identification and clinical significance of each formed element. The program has been well accepted by students.

### Disseminated *Malassezia furfur* in a Premature Infant

Michele B Zitzmann MHS, Louisiana State University Health Sciences Center, New Orleans LA; Misty S Melerine NCA(CLS), Our Lady of the Lake Regional Medical Center, Baton Rouge LA.

*Malassezia furfur* is the etiologic agent of *pityriasis versicolor*, also known as *tinea versicolor*. The organism is found worldwide as normal skin flora on humans, as well as on domestic animals and birds. *Malassezia furfur* normally colonizes an infant's skin during the first one to three months of life. In neonatal intensive care units, routine handling of a neonate is sufficient for colonization to occur. Due to the lipophilic nature of *Malassezia furfur*, it has recently been identified as the cause of systemic infection in

immunocompromised patients, particularly those receiving intralipid therapy through deep line catheters. This case describes a premature African-American female infant who was placed on lipid emulsion therapy as a result of her low birth weight. She soon developed respiratory and metabolic complications, and was diagnosed with necrotizing enterocolitis at 12 days old. Despite aggressive ventilator, cardiovascular, and antibiotic therapy, her condition declined. Life support was withdrawn and she expired at 47 days. An autopsy was performed at the request of the infant's mother. The autopsy revealed disseminated budding yeast, which was identified as *Malassezia furfur*.

### Effect of Arsenic Trioxide on Apoptosis, Bcr-Abl Expression, and Mitogen-Activated Protein (MAP) kinase Signaling in CML K562 Cells

MJ Shim MPH, Ansan College; HI Choi MS. Korea University Anam Hospital; TU Kim PhD, Yonsei University Wonju Campus, Kyounggi-do, Korea.

Arsenic trioxide ( $As_2O_3$ ) was recently demonstrated to be an effective inducer of apoptosis in patients with relapsed acute promyelocytic leukemia (APL) and in APL patients who showed no response to all-trans-retinoic acid (ATRA) and conventional chemotherapy. Bcr-Abl is a chimeric oncoprotein that is strongly implicated in chronic myelogenous leukemia (CML). CML cells are highly resistant to chemotherapeutic drugs. This resistance is mediated by the chimeric tyrosine kinase oncogene Bcr-Abl. To investigate the potential use of  $As_2O_3$  in human CML, we demonstrated the effects of  $As_2O_3$  on proliferation, induction of apoptosis, and expression of Bcr-Abl mRNA in K562 cells. Our results showed that  $As_2O_3$  causes a dose-dependent inhibition of growth, nucleosomal DNA fragmentations, and morphological changes by electron microscopy.  $As_2O_3$  also increased the activity of caspase-3, with appearance of its 17kDa peptide fragment. We also demonstrated the treatment of  $As_2O_3$  down-regulated Bcr-Abl mRNA levels by RT-PCR. To examine how  $As_2O_3$  affects the mitogen-activated protein (MAP) kinase signaling pathway, the relationship between MAP kinase response in K562 cells treated with  $As_2O_3$  was investigated.  $As_2O_3$  strongly induced the activation of phospho-p38 within one hour in K562 cells, while phospho-ERK1/2 was not activated.  $As_2O_3$ -induced apoptosis was significantly inhibited by addition of 10 mM SB203580, a specific inhibitor of p38. These results might be associated with the  $As_2O_3$ -induced apoptosis in K562 cells mediated by the activation of caspase-3, p38 and down-regulated transcription of Bcr-Abl mRNA.

### Evaluation of Methods in the Identification of *Streptococcus pneumoniae*

Tarja Kaijalainen MSc, Elja Herva MD, Maija Leinonen PhD, National Public Health Institute, Oulu, Finland.

Optochin sensitivity is the test most frequently used to identify pneumococcus (pnc) in clinical laboratories. Our aim was to compare optochin test to other conventional and two new nucleic acid (NA) methods. In our study, we started with 100 a-hemolytic consecutive streptococcal strains isolated from the nasopharynx of small children during pnc carriage. However, 97 strains remained viable for testing. Specimens were stored in STGG (skim milk-tryptone-glucose-glycerole)-medium at  $-80\text{ }^{\circ}\text{C}$  before culturing on blood agar plates with and without gentamicin (5 mg/ml). Identification methods included optochin sensitivity, bile solubility, capsular reaction, API 20 Strep, AccuProbe™, and pneumolysin-PCR (Ply-PCR). We used the optochin test as a gold standard for pnc identification. Among 97 strains, 65 were optochin-sensitive, 66 were bile-soluble (98.5%, 93.8%) and 58 had positive capsular reaction (87.7%, 96.9%). With the API 20 Strep test, 55 strains were identified as pnc, 36 as other streptococcal species, and six remained without species (78.5%, 87.5%). 65 strains were positive with AccuProbe™ (98.5%, 96.9%) and 73 with Ply-PCR- tests (100%, 75%). Bile and capsular tests had good agreement with optochin test and both NA-tests had high sensitivity but specificity was higher by AccuProbe™ than by Ply-PCR. When considering the application of identification methods to routine use in clinical laboratories, the following facts should be kept in mind: interpretation of capsular reaction requires experience and NA tests are quite expensive and require special equipment.

### Evaluation of the Results of Laboratory Analysis Obtained by Pregrade Students

Lucinda Núñez, Roxana Orrego MT, Talca University, Chile.

The purpose of this study was to investigate how proficient students who finish their university studies are in performing clinical chemistry analyses to meet high international levels of precision and accuracy. To get information we analyzed, in this University, the quantitative results produced by the students. This study involved two methods: Exton-Rose method for proteinuria and adequate methods for lipid profile. The students received the same sample in every laboratory session. They worked on the analysis, and at the end they reported their findings. Previously the samples were analyzed by a faculty professor. Considering the results obtained by all the students, HDL-cholesterol and LDL-cholesterol showed the lowest values with regard to SD. By contrast, such values were the highest for cholesterol and triglycerides. We estimate that the precision obtained by the students was within acceptable values. The results for DRP (relative percent deviation of the mean obtained by all the students with regard to the reference values) from LDL-cholesterol and HDL-cholesterol were lower than the triglycerides and cholesterol. These values, in some ways, show the accuracy of the group.

### The Evaluation of Vitek Susceptibility Systems of Vancomycin Resistant Enterococci and the Epidemiological Study by Pulsed Field Gel Electrophoresis

Hyang Sook Park, Ewha Woman's University, Mokdong Hospital; Sang Ae Kim, Cha Hospital; Seung Kwan Lee, Sun Chul Whang, College of Health Sciences, Korea University.

Vancomycin-resistant enterococci (VRE) have been isolated in many hospitals in Korea and other countries. The purpose of this study was to evaluate the efficacy of Vitek 1 and 2 systems for testing the susceptibility of VRE to vancomycin and teicoplanin. Pulsed-field gel electrophoresis (PFGE) was also employed for the epidemiological investigation of the VRE. 66 isolates of *Enterococcus faecium* with *VanA* gene were used in the susceptibility test. Determination of MICs by agar dilution method was performed as a reference test. 25 out of 66 isolates were tested by the PFGE. As controls, five isolates from Kuro hospital were also applied to this PFGE. Results of the susceptibilities (resistance to vancomycin) of all the isolates of *VanA* VRE correlated between the Vitek 1, Vitek 2, and agar dilution methods. However, very major and minor errors were found when testing the susceptibility of the strains to teicoplanin. There were significant differences in resistance patterns to teicoplanin between the Vitek 1 and Vitek 2 Systems; 53% of strains were resistant by Vitek 1 while 75.8% by Vitek 2.

### External Parasitology Quality Control Program: Nineteen Years of Experience in Chile

Berbeli Astorga, Pedro Herskovic, Juan Carlos Weitz, Eduardo Andueza, Instituto de Salud Pública de Chile.

The Chilean External Parasitology Quality Control Program has four components: enteroparasites, hydatid disease, Chagas' disease, and *Pneumocystis carinii* diagnosis. All four are comprised of a continuous education program for standardization of techniques, on-site supervision, and regular assessment via mailing of samples. The nineteen years experience of the stool examination component is shown. Two mailings of stool samples are made yearly to 342 laboratories. A formula is used to grade laboratories on each sample sent, 75% being considered as the lowest acceptable score. Mean scores (%) obtained by laboratories in the forty assessments were determined. The major diagnostic challenges for protozoans and helminths have been posed by *Entamoeba histolytica*, trophozoites, and *Diphyllobothrium* spp. ova respectively. Need of a continuous education program and assessment system as tools for the improvement of diagnostic accuracy in the examination of stool samples for parasites is underlined.

### Frequency of MTHFR677 Polymorphism in a WV Population

Jean M Chappell, Sarah Hesson, Poorani Sekar, Marshall University, Huntington WV.

**BACKGROUND:** The purpose of this study was to establish the frequency of MTHFR677(C→T) polymorphism in a West Virginian population. This mutation results in a thermolabile methyltetrahydrofolate reductase enzyme, which can lead to hyperhomocysteinemia, an independent risk factor for CVD.

**METHODS:** Fifty samples from Caucasian males were chosen. Genomic DNA was extracted and a 198bp fragment corresponding to the MTHFR677(C→T) was amplified by PCR. The fragment was cut with a *HinFI* endonuclease for identification of variants. Electrophoresis resulted in three distinct banding patterns correlating with the presence of the MTHFR677(C→T) allele. Wild types, A/A, resulted in one band at 198bp; heterozygous variants, A/V, results in three bands at 198bp, 175bp, and 23bp; and homozygous variants, V/V, gave two bands at 175 and 23 bp.

**CONCLUSION:** The frequency of homozygous variant genotype was found to be slightly higher than the national average of 10%. This study indicates a need for further study with a larger, more diverse population, and the need to correlate the genetic data with plasma levels of homocysteine, folate, and B12 to validate the mutation's effect on these parameters.

### Garlic Has Antichlamydial Activity

Irène Eriksson, Jens Boman, Department of Virology, Umeå University, Umeå, Sweden.

Garlic extract contains allicin that has been found to have a broad-spectrum antibacterial activity, but the possible antichlamydial effect has not been reported. In this study we have investigated the activity of culture medium garlic extract (CMGE) on *Chlamydia pneumoniae*, a common cause of human respiratory tract infections. In vitro analyses show that CMGE has a significant antimicrobial activity against the *C. pneumoniae*-strain. When the strain was cultured on a monolayer of HEp-2 cells with CMGE containing 3.8 mg/mL allicin in the medium, the growth of *C. pneumoniae* was reduced by 92%. With 15 mg/mL a total inhibition occurred but also a partial toxic reaction of the cells was noted. When the bacteria were cultured for 48 hours before adding the CMGE, the growth was reduced by 57%. With a preincubation of bacteria for 48 hours at +4 °C with 15 mg/mL allicin before culturing, the inhibition of growth was 96%. This shows that CMGE can inhibit growth if present at low concentrations. It can also reduce the growth when added later during the culture step. The effect on more strains of *C. pneumoniae* and *C. trachomatis* will be studied. In conclusion, our results show that garlic extract containing allicin has strong in vitro antichlamydial activity.

### Histological and Cytological Alterations in the Uterine Endometrium by Sex Hormone Producing Ovarian Tumor

Kenichi Yoshida PhD MT(JAMT), Masaaki Inoue MT, Yuuichi Nishida PhD MD, Hekinan Municipal Hospital, Hekinan City, Aichi Japan; Tetsuro Nagasaka PhD MD, Nobuo Nakashima, Nagoya University Hospital, Nagoya Japan.

A quantity of either serum estrogen or progestins, or both, controls histology of the uterine endometrium. If a patient had an ovarian tumor producing either hormone, the endometrium would be altered from normal features. Recently, we experienced five such cases, two cases of granulosa cell tumors, 29 and 30 years old; one case each of sex cord tumor with annular tubule (SCTAT), 64 years; mature cystic teratoma, 71 years; and clear cell carcinoma, 69 years. In each case, before operation, serum estrogen was 46 to 299 pg/mL and then the value decreased to normal (10 to 100 pg/mL). Cytological examination by endometrial smear revealed proliferation having a papillary or tubular structure with a high grade of stratification and severe cellular atypia. The cytology and histology of a patient with SCTAT was followed for 32 months before operation. The endometrium transformed from simple endometrial hyperplasia to atypical hyperplasia. In conclusion, when the endometrium shows hyperplasia for unknown reasons, the presence of an ovarian tumor producing unopposed sex hormones should be suspected.

### Honors Urinalysis: Student-Designed Web-Based Case Studies

Mary Ann McLane PhD CLS(NCA), University of Delaware, Newark DE; Susan Leclair PhD CLS(NCA), University of Massachusetts, Dartmouth MA.

The Department of Medical Technology at the University of Delaware (UD) offered an honors course section in Fall 2001: Urinalysis and Body Fluids. Five juniors, from a class of 31, took the honors section, attended regular lecture and laboratory sessions, and completed all course assignments. Each student chose a classical pathology and designed the patient demographics, urinalysis data including their own digital photomicrographs, and questions to form a case study in html format. The cases were put online, and evaluated by faculty and students from UD and the University of Massachusetts at Dartmouth. All of the cases were judged as having potential for use as teaching tools. Overall evaluation for educational quality averaged 2.13 on a scale of 1 (high) to 5 (low), while the honors students judged the experience to be, on average, 1.48, using the same scale. 'Most beneficial' aspects of the course included individual attention and the case study approach; 'least beneficial' were the extra scheduling challenges. When compared with GPA-matched students, the honors class achieved a significantly higher score ( $p < 0.05$ ) in the laboratory practical and comprehensive final exam but not in the final course grade.

### Incidence of HIV Positives and Hepatitis Surface Antigen Positives Among Donors in University of Benin Teaching Hospital.

Francis E Oronsaye MSc, JI Oronsaye AI MLS, University of Benin, Benin City, Edo State, Nigeria.

The purpose of this study is to determine the rate of human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) and hepatitis surface antigen among commercial blood donors at the University of Benin Teaching Hospital. 5,737 prospective commercial blood donors were screened for both HIV and Hepatitis B surface antigen using capillus HIV-1/HIV-2 and were confirmed by Immuno CombII HIV-1/HIV-2 Bispot according to manufacturers' instructions. 383 donors were positive for HIV while 609 donors were positive for Hepatitis B surface Antigen. 37 donors were positive for both HIV and Hepatitis B surface antigen. The need to make the screening of blood donors of HIV and hepatitis B surface antigen mandatory in all hospitals is very crucial so that the spread of HIV and hepatitis B can be prevented.

### Instructional Tool to Evaluate Validity of Published Diagnostic Assay Studies

Pat Greenup PhD, University of Alabama at Birmingham, Birmingham AL

The purpose of this presentation is to describe a practical instructional tool for the critical analysis and determination of the scientific rigor of published diagnostic assay studies. This tool supports the development of critical thinking and analytical reasoning skills. These decision-making abilities using evidence-based laboratory medicine information are essential for determining assay selection, clinical utility, and service quality for laboratory medicine services. The listing of questions are categorized by the major elements of empirical reports and were generated after review of research design principles, directions to authors for refereed journals relevant to laboratory medicine, NCCLS assay evaluation protocols, evidence-based medicine practices, and the CONSORT statement concerning clinical trial reports. Lessons learned by students from the use of this instructional tool in a scientific publications analysis course will be summarized. Student and instructor evaluation for the instructional tool will be described along with recommendations for use of this tool to assure technical and process quality concerning practitioners' abilities to achieve the related curricular standards in the NAACLS Standards of Accredited Educational Program for the CLS/MT, August 2001.

### Integrating a Research Facility within a Clinical Accreditation Program

Raelene M Perfetto MBA, Natalie Wallace, Sharon Cherie, The Johns Hopkins Hospital, Baltimore MD.

The origins of clinical laboratory testing are derived from the progress of research inspired by an idea, a novel approach, or new methodology. The transition from research protocol to clinical application is prompted by awareness of the diagnostic benefits and simultaneous increase in test request. Prior to clinical implementation, a gap analysis utilizing existing good laboratory practice (GLP) research principles against compliance with Clinical Laboratory Improvement Act (CLIA) standards should be performed on the research unit. This approach includes a thorough evaluation of the following: 1) Pre-analytical: test selection, personnel, policy and procedure, specimen identification; 2) Analytical: validation of methods, quality control and quality assurance, documentation, specimen handling; and 3) Post-Analytical: specimen resulting. We have had extensive experience in such assessments as our oversight responsibilities span across 90 disparate clinical laboratories, many of which originated within the research environment. Ease of progression to the clinical regulatory setting is dependent upon many factors that include the ability to transition from GLP to CLIA, readiness of research personnel, extent of clinical laboratory assistance required, and access to financial resources. The outcome to date has been to successfully meet the challenge of transitioning research laboratories to clinical standards.

### Master's Education in Clinical Laboratory Science in Finland

Saara Makkonen MA(Ed) MLT, University of Oulu, Finland

Clinical laboratory science (CLS) is a professional science. Its research target is clinical laboratory work seen as the professional approach of medical laboratory technologists (MLTs). The only master's program available for MLTs in Finland is arranged at the University of Oulu. The goal of the program is to educate experts for planning, development, teaching, and research in healthcare laboratories. To be eligible for this program, the student must have the MLT diploma from a polytechnic or a healthcare college. The program consists of 240 credits: general studies (48 credits), major studies (CLS, 112.5 credits), and optional studies (79.5 credits). The choice of optional studies depends on the student's plans for the future: pedagogic, administrative, or advanced studies in CLS are available.

### The Performance Evaluation of Yeongdong URiSCAN GEN 10SGL Urine Reagent Strip with Quantitative, Microscopic, and Culture Methods

Tae-Jin Han, Kyong-Ah Yun, Sail Chun, Byoung-Cheol Cho, Won-Ki Min, Asan Medical Center, Seoul Korea.

This study evaluated the correlation of URiSCAN GEN 10SGL (Yeongdong Co, Seoul Korea) urine strip with quantitative, microscopic, and culture methods. Specimens collected for urinalysis and culture were used. The mean of reflectance rate change (change %R) were compared with the results of the corresponding quantitative methods for protein (pyrogallol red molybdate), glucose (glucose oxidase), bilirubin (bilirubin oxidase), urobilinogen (Ehrlich), pH (pH meter), and specific gravity (refractometer). To calculate the sensitivity and specificity, we used microscopic examination for leukocytes and erythrocytes, and used urine culture results for the nitrite test. The correlation coefficients between the change %R of URiSCAN GEN 10SGL and the corresponding quantitative methods exceeded 0.8, except bilirubin and specific gravity ( $p < 0.01$ ; respectively). The agreements of identical or neighboring concentration block were more than 90%, except urobilinogen and specific gravity. The sensitivity and specificity of URiSCAN GEN 10SGL were 63.6% and 94.2% for leukocytes; 92.8% and 74.1% for erythrocytes; 74.4% and 85.0% for nitrite producing organisms. URiSCAN GEN 10SGL had acceptable accuracy and agreement compared with the quantitative methods and culture results, and satisfactory sensitivity and specificity for leukocytes and erythrocytes detection.

### Polymerase Chain Reaction Concept Attainment by CLS Students with and without "Hands-On" Experience

Lynda A Britton PhD CLS(NCA), Louisiana State University Health Sciences Center, Shreveport LA.

Five clinical laboratory science students at a health sciences center participated in a qualitative study of their knowledge of Polymerase Chain Reaction (PCR). Students took a one credit hour course, Introduction to Molecular Diagnostics. As part of this course, students were lectured twice about PCR by different instructors, performed PCR in a student laboratory, viewed an instructor-generated computer program that described all the concepts tested, and observed a clinical laboratory performing nucleic acid amplification. Three students observed PCR and two observed other methods. Following these activities by at least a week but before taking an exam, all were individually interviewed in depth for approximately 40 minutes. Students' knowledge of nucleic acid chemistry and PCR was probed. Using a biological literacy model developed previously, students described an average of 80% of major concepts. This number was similar to 10 students in another study who experienced the same computer program and read a novel that described PCR. Those students recalled 79% of major concepts in comparable interviews. It was expected a dedicated course that included performance of PCR would improve student learning. Although it is difficult to compare students in different classes, increased concept attainment was not detected.

**Powerful Benefits of Technology: Education and Marketing**

Lester Hardegree EdD, Hassan Aziz PhD CLS(NCA), Armstrong Atlantic State University, Savannah GA.

This presentation will demonstrate how effective utilization of Web pages and current information technologies can greatly enhance the instructional process and educational outcomes of students and increase student enrollment in CLT/CLS programs. The inclusion of Web-based communications and computer technologies such as WebCT and multimedia resource into the curriculum promotes interactive and cooperative learning and increases communication with and between students and faculty. Utilization of these technologies by CLT/CLS educators better matches the instructional process with current student learning strategies. Educational programs can also increase student enrollments if they view their home Web page as 'a marketing tool'. Using CLS department Web pages as examples, information communicated to the public and prospective applicants will be presented. Attendees will learn how they can more effectively target their audience and better promote their home Web page.

**Prevalence of Anisakid Parasites in Musculature and Viscera in Chilean Commercial Fish**

Berberí Astorga, Instituto de Salud Pública de Chile; Ximena Alistar, Universidad de Chile; Juan Carvajal PhD, Universidad Los Lagos; José Luis Fernández, Marlys Muñoz, Rosa Catalán, Anita Soto PhD, Universidad Mayor.

A study was carried out in Chilean restaurants to determine the species of fish used in dishes such as cebiche and Japanese food that are causing human anisakiasis. The objective of this study is to determine the prevalence of anisakids based on the size, weight, and species of fish and the presence/absence of parasites in the fish. The following species were examined: 61 *Genypterus maculatus*, 94 *Merluccius gayi*, 66 *Cilus montti*, and 138 *Roars australis*. The size and weight of fish were recorded and the parasites were sampled by means of visual observation of musculature and viscera, translumination, and artificial digestion. The prevalence found in fish was as follows: *G maculatus* 34.4%, common hake 23.4%, corvina 75.8%, and *R australis* 10.1%. There were significant differences between the weight of the fish and the presence of parasites in *G maculatus* and common hake. The results indicate the risk of infection of anisakiasis in persons consuming raw fish. The species of anisakids present during this study belong to the *Anisakis simplex* complex: *Anisakis pegreffii*, *Anisakis simplex* 'C', and *Pseudoterranova cattani*. This study highlights the importance of appropriate education for salespersons of fish and restaurant food handlers regarding sanitary practices in food handling and fish preparation.

**Professional Competence of MLTs in Finland**

Riitta Lumme, Helsinki Polytechnic, Helsinki Finland

The main purpose of this qualitative research was to produce knowledge about the current and future professional competence of medical laboratory technologists (MLTs) in order to further develop the study program for a polytechnic degree in Biomedical Laboratory Science. In the theoretical part, qualifications, and competence were analyzed broadly in the context of medical laboratories. Experimental data was collected by using theme interviews from the key-informants, consisting of MLTs, a clinical chemist, and physician. Second part of data consisted of six curricula for MLTs at Finnish polytechnics during 2000–2001. Theme interviews and curricula were studied by content analysis. The results showed the core of the MLTs work was laboratory processes consisting of preanalytic, analytic, and postanalytic components. In primary healthcare, the preanalytic part becomes the most important as analytic processes become more integrated and more automated. MLTs have an important role in analyzing data and assessing quality of process. Problem-solving skills must be emphasized. Additional competencies are teaching skills; management, communication, and teamwork skills; and the ability to develop work and continuing education. All the curricula were to some extent fragmentary. The inference was that graduates of polytechnics are employees with the basic professional competence needed in public healthcare. However, the curriculum does not contain clear elements of the necessary requirements to teach for future competencies. Furthermore, there is a need to improve the curricula to help students develop the ability to deal with changes in laboratories.

**Quality of Blood-Samples during Transport**

Lise Walberg, Dagny Gunvor Ulsaker, Oppland Sentralsykehus – HF, N-2819 Gjøvik Norway.

The aim of this work was to determine if the quality of blood samples is ensured during transport from the GP's office to the laboratory. Temperature, exposure to light, and too long time spent in transport are known to greatly influence the analytical results. False results due to these factors may have an adverse effect on diagnosis and treatment of patients. We have searched for a transport-system that would protect the samples from these factors. In Oppland the temperature can be +25 °C in summer and –25 °C in winter. This means a system that is well insulated. We could not find any existing transport-system that fulfilled our specifications. Therefore we designed and developed a transport box that seems promising – called LABBOX®. This poster presents the results of our testing of LABBOX®. We conclude that LABBOX® will protect samples from adverse factors and will save both patients and the healthcare system unnecessary expense.



### Student and Course Master Evaluation of a WebCT Health and Safety Management Course

Pat Greenup PhD, University of Alabama at Birmingham, Birmingham AL.

This poster presentation will summarize evaluation findings for an online health and safety management course. This one credit pass/fail course has been offered for eight quarter terms and one semester since the fall of 1999. Based on a 78% response rate (76/97) students' responses for fall 2001 were positive to 16 items related to course design and delivery. Additional positive comments included: 1) liked not going to class; 2) liked working at own pace, and 3) liked the structured format. Negative responses included: 1) time consuming to read; 2) 54 of 64 students indicated that the course should be two credits; 3) 10 of 76 students wanted some classroom reinforcement; 4) the http links did not always work; and 5) students must have time management skills. Course master evaluation included: 1) a glossary with links to text is needed; 2) all links must be checked periodically; 3) multiple choice quizzes are needed for each unit; 4) online exam grading is needed for the brief answer questions; and 5) additional evaluation of student learning style related to performance is needed. Recommendations for future online course development will be summarized based on two years experience with this online course.

### A Suggestion for Remodeling of CLS Curricula in Korea

Kyung Jin Cho PhD MT, Chang Kyou Lee PhD MT, Korea University, Seoul; So Woong Jeong MS MT, TaeGu Health College, TaeGu; Tae Un Kim PhD MT, Catholic University of Pusan, Pusan; Hee Joo Moon PhD, Tae Jeon Kim PhD MT, Hyung Joon Bae PhD MT, Seoul Health College, SeongNam; Seung Gu Choi PhD MT Shin Heung College, EuJeongBu; Shin Moo Kim PhD MT, Chong Ho Kim PhD MT, Bok Hee Jin PhD MT, Won Kwang Health Science, Ik San.

Korean clinical laboratory science (CLS) educators are well aware of the necessity of introducing new technologies such as molecular diagnostics and cytogenetics into their current curricula. Most want to identify problems in their curricula and recognize it is important to develop a model CLS curriculum that can keep pace with environmental changes. It might be urgent for us to develop a new CLS model curriculum compatible to the changes. Eleven representatives of the Korean Clinical Laboratory Science Educators Council (KCLSEC) reviewed the curricula of the 22 CLS programs in Korea and analyzed various data obtained from cyber surveys or mail surveys sent to the CLS educators including clinical instructors. Some American CLS program directors were asked their opinions on recent major changes in their curriculum remodeling. Based on the survey reports, we had a number of discussions, including at the KCLSEC general meeting. Even though there was no consensus, we managed to attain a model curriculum. In the model curriculum, courses such as special chemistry

for industrial health or cytogenetics were added while other existing courses such as molecular diagnostics were further developed.

### Updating the CLS Curriculum to Include an Introductory Course in Molecular Diagnostics

Mary E Miele PhD, University of Delaware, Newark DE.

Molecular techniques have moved from research laboratories into the mainstream clinical laboratory. An "Introduction to Molecular Diagnostics" course has been added to the University of Delaware's Department of Medical Technology's curriculum. A two-credit lecture course and one-credit companion laboratory course were developed to provide a solid knowledge base in molecular techniques used in today's clinical laboratory. This course was offered at the first semester junior level. Topics discussed include general concepts of nucleic acids, basic cell physiology, genetics, and foundations of molecular biology. Specimen collection, nucleic acid isolation and quantitation, gel electrophoresis, restriction endonucleases, hybridization, blotting, and amplification techniques were discussed and performed. Applications of these techniques to aid in the diagnosis and/or monitoring of treatment of genetic, hematologic, malignant, and infectious diseases were presented. Laboratory exercises included genomic DNA isolation and RNA isolation, polymerase chain reaction (PCR) and reverse-transcription PCR, restriction fragment length polymorphism analysis and Western blot analysis. This course was designed to prepare our undergraduate students for their future employment in the clinical laboratory workplace where molecular diagnostic tests are rapidly becoming part of the routine test menus offered.

### Urinalysis with Multistix® 8 SG Reagent Strip Test Compared with Urine Microscopy

Bergljót Halldórsdóttir BSc (NCA), Margrét Árnadóttir PhD, Örn Ólafsson PhD, Landspítali, University Hospital, Hringbraut, Reykjavík Iceland.

The study was carried out to assess to what extent urine microscopy could be replaced by Multistix® 8 SG reagent strip. The results of the Multistix® 8 SG tests for leukocyte esterase, hemoglobin, and nitrite were compared to the results of microscopic count of white cells, red cells, and bacteria in the urine samples. The urine was considered abnormal when microscopic analysis showed white cells  $\geq 5$ /high power field (HPF), red cells  $\geq 2$ /HPF, and/or bacteria  $\geq 3+$ /HPF. Of 526 routine urine samples analyzed, 263 samples were found abnormal. Sensitivity and specificity for leukocyte esterase was 80% and 96%, respectively, for hemoglobin 84% and 95%, and for nitrite 64% and 99%. Also three, four or six different tests on the Multistix® 8 SG (at least one test positive) were used to detect abnormal urine. Best results were obtained by using a combination of six tests of the Multistix® 8

SG for leukocyte esterase, hemoglobin, nitrite, protein, glucose, and/or ketone, giving sensitivity of 90% and specificity 85%. Positive predictive value was 86% and negative predictive value 90%. Multistix® 8 SG is a valuable tool to detect abnormal urine, indicating that urine microscopy is probably only necessary when the Multistix® 8 SG is positive.

### The Use of the CTAD Tube in EDTA-Dependent Pseudothrombocytopenia

Chun Hee Kim MT, Sung Yong Cho MT, Sang Hee Han MT, Mi Ok Choi MT, Hyun Sook Chi MD, Asan Medical Center, Seoul Korea.

**PROBLEM:** EDTA-dependent pseudothrombocytopenia (EDTA-PTCP) induced by artifactual EDTA-dependent anti-platelet antibodies cause falsely low platelet counts from the hematology analyzer. We compare the correction of partial draw citrate, citrate theophylline adenosine dipyridamole (CTAD) tube, and KM on EDTA-PTCP.

**METHOD USED:** We selected specimens from 34 patients with platelet clumping in EDTA blood. We added 20mg of KM to the original EDTA blood and allowed the mixture to stand for 30 minutes. Prior to reanalysis, the samples were continuously vortexed for 10 seconds. In addition, two new specimens were collected from each patient, one partial draw in sodium citrate and one in a CTAD tube. New platelet counts were performed on the KM treated, partial-draw, and CTAD tubes and the data was compared to the baseline.

**RESULTS:** Among 34 cases that showed moderate platelet clumping in the EDTA blood, adequate correction of platelet count was noted in 18 (52.9%) of the CTAD tube, 9 (26.5%) of the KM-treated EDTA tubes and 7 (20.6%) of partial draw citrate tubes. The median platelet count was 157,000/ $\mu$ L in CTAD, 143,500/ $\mu$ L in citrate, and 102,000/ $\mu$ L in KM.

**CONCLUSION:** The correction rate of platelet counts in the CTAD tube with the cases of EDTA-PTCP was 52.9% which was better than the result of KM-treated or citrate tube ones. We would recommend resampling in the CTAD tube.

## CASE STUDY PRESENTATIONS

### Acute Hemolytic Transfusion Reaction Caused by High Titer Anti-A

Linda Hawthorne MHS, Leslie Moore, Wei Sun, MD, Diana Veillon, MD, Aixa Garcia MD, Xin Gu MD, Karrie Hovis CLS(NCA), Louisiana State University Health Sciences Center, Shreveport LA.

Routine pretransfusion testing was performed on a nine-month-old female scheduled for neurosurgery. Compatibility testing found

she was A positive with negative antibody screens. Directed donor red cell units drawn from the father (A positive) and mother (O positive) were irradiated and transfused. After transfusion of 80 milliliters of the mother's unit, the infant developed rigors, became irritable, cried continuously, and produced red urine. At our institution, non-type O infants are often transfused aliquots of type O red cells with no such incidents. Transfusion reaction workup revealed no clerical error and satisfactory visual inspection of the unit. The most significant findings were a positive direct antiglobulin test and hemoglobinuria. Anti-A was eluted from the infant's red cells. Titer of anti-A in mother's plasma was 64 at immediate spin and 2048 at antiglobulin. Results indicated an acute hemolytic reaction had occurred in the infant. Previous experience with ABO titers indicate most type O individuals have anti-A titers of 16 or less at immediate spin and 32 or less at the antiglobulin phase. This high titer anti-A apparently caused an acute hemolytic transfusion reaction. Future transfusion of the infant with the mother's blood would require washed red cells.

### Case Study: *Diphyllobothrium latum* Infection

Melissa Leiva, The University of Texas Health Science Center at San Antonio, San Antonio TX.

With an increase in international travel and the variety of ethnic restaurants, there has been an increase in exposure to, and a taste for, specialty dishes. This diversity and expansion in dining is not without risks. This is the case of a 25-year-old Asian male who presented to the emergency room complaining of a 'tapeworm' in his stool. The patient had no significant travel over the last five years, but admitted that he ate large amounts of fish, especially sushi. Since the patient's physical exam was unremarkable, no labs were drawn and the worm segments were sent to microbiology for identification. When the specimen was identified as *Diphyllobothrium latum*, the patient was given a dose of Praziquantel and discharged. This presentation will discuss the life cycle, epidemiology, secondary complications, diagnostic methods, and treatment available for cases of *D. latum*.

### "I've Got It ... Under My Skin"

Linda A Smith PhD CLS(NCA), The University of Texas Health Science Center, San Antonio TX.

Infections with uncommon organisms can be difficult to detect. The clinician must have extensive patient history as well as an index of suspicion before the proper specimen is collected and submitted to the laboratory for identification. This case is that of a 25-year-old female who, about ten years ago, had lived in Africa for almost two years. She had been treated for malaria while living there, but otherwise had no significant disease history. She had a six-year history of intermittent, unexplained episodic swellings on her face and extremities which would resolve without treatment. She presented with a repeated complaint of orbital swelling and watering and burning of

her eyes and reported feeling a 'crawling sensation' across her forehead and in her eyes. At the time of examination, the clinician observed a worm migrating across the eye. A blood test revealed sheathed microfilaria subsequently identified as *Loa loa*. The patient was treated with diethylcarbamazine without significant side effects. No microfilaria has been detected since treatment.

### Think Global – Act Global: Internationalizing a CLS Curriculum

**Ellen Hope Kearns MS**, California State University, Dominguez Hills, Carson CA; **Vincent S Gallicchio PhD**, Chandler Medical Center, University of Kentucky, Lexington KY.

Increasing globalization creates new challenges and opportunities for clinical laboratory science (CLS) educators to adequately prepare graduates with essential competencies, attitudes, behaviors, knowledge, and skills for the transnational workforce of the new millennium. The specific problem to be addressed is that budgetary constraints and regulatory agency policies that govern CLS education and training, limit opportunities for students to participate in traditional study abroad programs for academic credit during their course of study. To this end, innovative and creative ways to incorporate international activities into the CLS curriculum have been developed and delivered in the classroom, campus-wide, overseas, and via satellite. A number of these activities were in collaboration with higher education institutions and organizations in the U. S. and overseas such as the University of Oxford, World Health Organization, and Inter-American Distance Education Consortium, to name a few. Based on the overall results obtained from formal evaluations and informal participant feedback over a ten-year period, these international programs proved to be very successful and popular among students and faculty alike. The authors will present effective ways to infuse international perspectives into the CLS curriculum.

### Unexpected Hemoglobin Profile Following Red Blood Cell Exchange

**Karrie Hovis CLS(NCA)**, **Diana M Veillon MD**, **Xin Gu MD**, **Alice Cassiere**, **Linda Hawthorne MHS**, **MT(ASCP)SBB**, **Jenny Kaltenbach**, **James D Cotelingam MD**, Louisiana State University Health Sciences Center, Shreveport LA.

A sample for hemoglobinopathy evaluation was submitted on a 25-year-old black female. Work-up included a complete blood count with differential, peripheral smear examination, sickle solubility assay, alkaline and acid electrophoresis, and hemoglobin A<sub>2</sub> and F quantitation by HPLC. All results were reviewed at the daily hematopathology sign-out conference. Results were as follows:

RBC:  $2.96 \times 10^6/\text{mL}$ ; H/H: 8.41g/dl/26.0%; MCV: 87.8fL; RDW: 17.0%; PLT:  $359,000 \times 10^3/\text{mL}$ ; sickle solubility: positive; and alkaline and acid electrophoresis, and HPLC: 74.4% Hemoglobin A, 13.6% Hemoglobin S, 8.7 % Hemoglobin C, 3.3% Hemoglobin A<sub>2</sub>, and <1% Hemoglobin F. Peripheral smear examination revealed frequent target cells and rare sickle cells. No SC crystals were observed. A transfused or exchanged SC disease was suspected. Review of the blood bank history revealed a recent red blood cell exchange. Review of the patient's previous hemoglobin profiles indicated the presence of Hemoglobin S, but no Hemoglobin C. Evaluation of donor units revealed one unit with Hemoglobin C trait. Evaluation of hemoglobinopathies is frequently complicated by transfusion or exchange. Tracking of hemoglobin profiles by patient provides useful information when reviewing unusual results. Alternatively, repeat testing at a later date often clarifies ambiguous results.

### RESEARCH PRESENTATIONS

#### *Bordetella bronchiseptica* Resurgence in HIV-1 Positive Teenage Smokers and Chronic Alcoholics Previously Immunized with DTP Whole Cell Pertussis Vaccines.

**Anukam C Kingsley MSc**, **Dennis E Agbonlahor PhD**, University of Benin, Benin City Nigeria.

*Bordetella bronchiseptica* has been recognized as a respiratory tract pathogen in many domestic and wild animals, and it is associated occasionally with sinusitis, tracheobronchitis, whooping cough-like illness, and pneumonia in humans. However, there seems to be an emergence of *B. bronchiseptica* infection in HIV-1 positive teenage smokers and chronic alcoholics, who were previously immunized with the three doses of DTP whole cell pertussis vaccines. We investigated 158 teenage (14 to 18 years old) cigarette smokers, and chronic alcoholics, who presented with sporadic cough and nasal secretions. Thirty-seven were diagnosed HIV-1 positive. Nasopharyngeal swab (calcium alginate) specimens were collected by passing the swabs through the nares into the posterior nasopharynx and rotating the swabs for a few seconds. The swabs were plated for culture of *Bordetella* organisms in charcoal cephalixin blood agar. The plates were incubated for two to seven days at 35 °C in a humid environment. Suspected colonies were tested by slide agglutination with antisera to *B. pertussis*, *B. parapertussis*, and *B. bronchiseptica*. Results indicated that out of the 37 patients tested, 26 had positive cultures for *Bordetella* organisms: 15, *B. bronchiseptica*; 7, *B. pertussis*; and 4, *B. parapertussis*. This study indicates that *B. bronchiseptica* is resurging in immuno-compromized teenagers engaged in cigarette smoking, and HIV-1 infection is becoming a surrogate marker for *B. bronchiseptica* infection, an organism usually associated with domestic and wild animals.

### A Comparison of Four Different D-dimer Assays

NT Smernoff, Lutheran General Hospital, Park Ridge IL; C Daniele, Diagnostica-Stago, Inc., Parsippany NJ; DL McGlasson, 59th Clinical Research Squadron, Wilford Hall Medical, Lackland AFB TX.

The purpose of this protocol was to compare four of the D-dimer assays available for testing in the laboratory marketplace. Ninety randomly selected patient specimens were assayed for the presence of D-dimers using four different methods: SimpliRed (AGEN Biomedical Ltd, Brisbane Australia), Stago (Diagnostica-Stago Inc, Parsippany NJ), Vidas (bioMerieux, Marcy-l'Etoile France), and BCS (Dade-Behring, Marburg GmbH, Marburg Germany). The SimpliRED assay was run on fresh citrated whole blood; the other three assays were run on frozen citrated platelet poor plasma. Results from each of the three quantitative tests were normalized by dividing the observed result by the upper limit of normal. All data analyses were performed using normalized results, except for the SimpliRED results which were positive/negative, and were compared in that format. When normalized test results were averaged, the SimpliRED result was excluded from the calculation. Results from each of the methods were compared to one another, and to average results. The SimpliRED method shows a significant percentage of false negative results when compared to the other three methods individually. The SimpliRED method showed few false positives by the same criteria. The Vidas and Stago methods agreed very well, by statistical analysis: correlation coefficient = 0.9424. The BCS method gave a higher incidence of false negative results (lower sensitivity) than the Vidas or Stago procedures. Consistent with this observation, the BCS agreed more closely with the SimpliRED method than either of the other two methods. There are no international standards for testing or reporting D-dimer results. By performing this protocol laboratories can better evaluate individual assays and make educated choices about the testing in their facilities.

### Competency Assessment in the Small Hospital Laboratory

Aina W Cummins MS CLS(NCA), St Rose Hospital, Hayward CA.

Federal regulations and various accrediting agencies require all laboratory personnel to be evaluated periodically for competence. For clinical laboratory scientists, some very specific competency assessment guidelines must be followed. In a small community hospital, where no one person is designated as a quality assurance officer, complying with such requirements may seem formidable. Competency testing may be delayed, possibly not even attempted, because no one feels they have adequate time. Since a shared burden appears less overwhelming, the solution is to involve as many people as possible. Section leaders may choose to delegate one or more of their employees to prepare one or more assessment exercises according to specified guidelines. After approval of the exercise, the designee is instructed to assess the staff where required. Actual testing should require ten minutes or less per employee per

exercise. Employees find this approach less intimidating than customary testing procedures. The laboratory manager will initiate the process with key personnel. Documentation for each employee will consist of a master list of requirements checked off by the various test administrators.

### Health Education Strategy in the Control of Urinary Schistosomiasis

Kamga Fouamno Henri Lucien PhD, University of Buea, Buea, Republic of Cameroon.

The purpose of this study was to determine the impact of health education intervention on the perception and prevalence of urinary schistosomiasis among school children in endemic rural communities. The rapid assessment technique method was used to determine the prevalence of *Schistosoma haematobium* infection in Gounougou (experimental 1), Ouro-Doukoudje (experimental 2), and Lagdo (control). There was a correlation between the questionnaire approach, the biochemical testing, and ova detection rate ( $r$  dispersed between 0.98 and 1.00). The study was planned in two phases. In the first phase, after collection of the base line data, school children of the experimental villages received health education. In Gounougou, children were given a pre-designed control procedure; in Ouro-Doukoudje, they were invited to design their own control procedure under the supervision of the investigator. A second investigation conducted eight months after the end of the first intervention showed a significant drop of prevalence in Gounougou (53.2% vs. 29.6%  $p < 0.005$ ) and Ouro-Doukoudje (39.4% vs. 17.7%  $p < 0.005$ ) but not in Lagdo (31.4% vs. 30.4%  $p > 0.25$ ). It also showed a significant increase of the awareness in Gounougou (14.5% vs. 94.7%  $p < 0.0005$ ) and Ouro-Doukoudje (4.5% vs. 98.5%) but not in Lagdo (18.4% vs. 19.4%  $p > 0.10$ ); with the greater increase in Ouro-Doukoudje (94.0%) as compared to Gounougou (80.2%,  $p < 0.05$ ). The investigator concluded that health education through the frame work of school could be adopted as a national policy for urinary schistosomiasis control programs in tropical developing countries, The programs can be planned with school children as full partners, provided they receive appropriate orientation.

### Incidence of Glycosuria in the Korle Bu and Mamprobi Polyclinics

Mensah O M.phil, Agyakwa KA, Maddy SQ, PhD, Ghana Medical School, Accra Ghana.

A study to find the incidence of glycosuria in patients attending the Korle bu and Mamprobi Polyclinics is reported. A total of 800 subjects attending the clinics for the first time had their random urine samples tested for glucose, using Clinistix (a glucose-oxidase reagent test strip) method. Out of the 800 subjects, 633 were general attendees, and 167 were pregnant women attending the antenatal (pre-natal) clinics. In the sample population 33 cases of gly-

cosuria were found - an incidence of 4.1 %. Among the pregnant women five cases of glycosuria were found - an incidence of 0.63%. The highest incidence of glycosuria (2.0%) was found in the age group of 21 to 30 years old. Glycosuria was more common in females than males. Contrary to the generally held view that incidence is higher in pregnant than non-pregnant women; the incidence among the pregnant women was 0.63% as compared to a higher 3.0% of the non-pregnant women.

### Simple and Rapid Genetic Identification of *Aspergillus*

Dirk Schmidt, MTAL PD Dr. Med. Peter-Michael Rath. Institut f. Med. Mikrobiologie, Universitätsklinikum Essen, Hufelandstraße 55, D-45122 Essen.

The aim of the study was to find a convenient method for identifying members of the genus *Aspergillus*. Up to now identification has been based on macro- and micromorphological features. Another approach could be partial sequencing of the internal transcribed spacer (ITS) 1 region of the ribosomal DNA gene cluster. Amplification of fungal DNA from agar-containing media usually fails because agar can inhibit polymerase chain reaction (PCR). However, by substituting agar with gellan gum we were able to carry out DNA extraction, PCR, and sequencing in a single day. In our study we investigated 30 isolates of six *Aspergillus* species (*A. fumigatus*, *A. flavus*, *A. niger*, *A. terreus*, *A. ustus*, *E. nidulans*). After 24 hours of growth, media blocks containing mycelia were homogenized, DNA was extracted and the ITS1 region was amplified and sequenced. Alignments revealed 26 correct identifications on the species level and four on the genus level, respectively. We conclude that this is a convenient method for identifying members of the genus *Aspergillus*.

### Unusual Coagulopathy in Rabbits (*Oryctolagus cuniculus*) following Brown Recluse Envenomation (*Loxocles reclusa*)

DL McGlasson MS CLS/NCA; SD Miller MD, HH Harroff DVM, 59th Clinical Research Squadron, Wilford Hall Medical Center, Lackland AFB TX.

The original purpose of this study was to explore whether dapsone, currently considered the treatment of choice for brown recluse spider (BRS) bites, is superior to benadryl, triamcinolone, and colchicine. The brown recluse spider bite causes a necrotic skin cellulitis. Unfortunately the treatments didn't work well in controlling the necrotizing problem. What we did find was a heretofore undescribed coagulopathy in all of the test animals that received a BRS venom injection. Forty-four animals were divided into four different groups according to the medication they were to receive for treatment of the BRS envenomation. Each group had controls that only received the BRS toxin. Baseline specimens for PT, APTT, and fibrinogen were obtained. Each animal received a 0.2mL intradermal injection of 20 mg/mL BRS venom in nor-

mal saline on the dorsum of the back. At 72 hours a second PT, APTT, and fibrinogen were obtained. All of the coagulation tests were performed on an STA automated coagulation analyzer using Diagnostica-Stago Inc (Parsippany NJ) reagents. All of the animals had grossly elevated APTT and fibrinogen results at 72 hours. We then investigated individual coagulation factors (VIII, IX, XI, and XII) for evidence of coagulation inhibitors. The FVIII, FIX, and FXI levels were much higher at 72 hours. The FXII levels were virtually unchanged. APTT 1:1 mixing studies, using normal rabbit plasma, corrected to the baseline limits which usually indicate a factor deficiency. We did not find an individual factor deficiency in the intrinsic factors. There was no evidence of a lupus anticoagulant present in further testing. A subsequent study is underway to determine the cause of the elevated APTT finding. In humans there has been anecdotal evidence of a mild DIC condition following a BRS bite. This has never been described in any animal species.

### Utilization of Irradiated Blood Components for Prevention of Transfusion-Associated Graft-Versus-Host-Disease in Korea

Seung-Kuk Yoo MT, Seung-Ho Lee MT, Chung-Hyun Nahm MD, Soo-Hwan Pai MD, Inha University Hospital, Incheon Korea.

**BACKGROUND:** Recently, transfusion of irradiated cellular blood components for the prevention of Transfusion-Associated Graft-Versus-Host-Disease (TA-GVHD) has gradually increased. TA-GVHD has been observed mostly in severely immunodeficient patients transfused with T lymphocytes or in immunocompetent patients who receive HLA-homozygous blood for the recipient's haplotype. At present, there is no effective treatment for transfusion - associated GVHD and the mortality rate is over 90%. We evaluated the use of irradiated cellular blood products at Inha University Hospital in Korea.

**METHODS:** Irradiation was performed with <sup>137</sup>cesium at a dose of 30Gy (3000 rads). We reviewed the blood bank records and medical history of the patients from January 1998 to July 2001 at Inha University Hospital in Korea.

**RESULTS:** Among 150,255 blood units issued from January 1998 to July 2001, 34,107 (22.7%) were irradiated. The proportion of the irradiated blood components was increased year after year; 20 % (1998), 21% (1999), 23% (2000), and 27% (2001), respectively. The irradiated blood components were used for patients with acute myelogenous leukemia (AML, 27%), acute lymphoblastic leukemia (ALL, 18%), multiple myeloma (10%), malignant lymphoma (9%), myelodysplastic syndrome (7%), chronic myelogenous leukemia (7%) solid tumors (12%), neonates (9%) and first-degree family members (1%), respectively.

**CONCLUSIONS:** We observed the gradual increase of the use of irradiated blood as the physicians' understanding of GVHD increased.