



# Newsline

California Association for Medical Laboratory Technology  
Vol. 42 No.4

December, 2016

Published by and for CAMLT



## CAMLT Names Cheryl Jackson-Harris 2016

### Clinical Laboratory Scientist of the Year!!

What is the highest award given each year at the CAMLT Annual Meeting? It is Clinical Laboratory Scientist (CLS) of the year. Everyone loves a good surprise and all those present at the Installation Banquet at the Pasadena Hilton on Saturday night, September 17<sup>th</sup>, witnessed a heartwarming one as Cheryl Jackson-Harris was honored with this recognition.

Cheryl is the CLS Program Coordinator at California State University, Dominguez Hills (CSUDH) and has been involved in the program since 1990. It is the largest CLS training program in Southern California. She was brought into the program by Dr. Kathleen McEnery, previous chair of the CLS Program at CSUDH, and worked closely with Dr. James Welch as well. She is a very dedicated individual both as a lecturer and mentor for her students.

Working at Daniel Freeman Medical Center for almost 20 years as a Hematology Supervisor, Phlebotomy Supervisor and Lab Manager, she was also involved in the CLS training program there.

In 2006, ASCP honored Cheryl as "Educator of the Year". She has also been an active member of the Southern California Medical Technology Educators group.

Originally from New Orleans, Cheryl moved to Los Angeles in 1969. This CLS visits New Orleans frequently to catch up with family and friends. Loving movies, she has a TV in every room.

We were especially pleased that Cheryl's daughter was able to surprise her at the banquet.

Congratulations Cheryl! You are a most deserving Clinical Laboratory Scientist of the Year!

### ALSO IN THIS ISSUE. . .



POLITICAL UPDATE  
PAGE 3



CONVENTION HIGHLIGHTS  
PAGE 8



CE - PRION DISEASES  
PAGE 14

AND  
MORE



# Message From the President



## MEMBERSHIP MEANS YOU CARE

When you meet someone new and they ask you about your profession, what do you say? Are you proud to be a member of your professional organization and are you able to explain how important the work we do is and how our high standards are necessary for public safety?

**Membership means you care. It means you care enough about your profession to help shoulder the burden.** You can and will be able to make a difference. CAMLT has a voice in Sacramento through our professional legislative advocate, our pro-active Governmental Affairs Committee and a network that monitors, lobbies, and sponsors legislation to enhance and safeguard our profession.

You can become part of all of this. Start by volunteering at the chapter level...for a committee, activity, or a social event. Contact your local chapter representative (use the CAMLT.org website) and say you want to find out more about becoming a volunteer.

This past year we have begun to formulate and implement several parts of our new Strategic Plan. Work force development is high on the list. We are doing this by showing support for the training programs in our state and publicizing the need for more training positions. We are personally visiting hospitals and universities where the training is taking place. We hosted more than 100 students from Southern California for Student Day at the Annual Meeting in September. Our keynote speaker, Diana Mass, was enjoyed by all and so were the student poster presentations.

This year, the House of Delegates enjoyed an increase in student delegates and new member participation. The new slate of officers was elected and committees were appointed.

Let us welcome to the Board of Directors Danuta Bowler, our new District II Consultant and Joyce Ma, our new District IV Consultant. Thank you to Mark Briones, District III Consultant, Josie Schrage our Secretary, Mary Jeanne Stavish our Treasurer, and Dora Goto, Past President who will continue to serve another term.

Thank you to Melissa Parry, District II Consultant and Aylmer Dy, District IV Consultant. They have completed their terms on the Board of Directors.

Finally, this is the holiday season when we rededicate ourselves to those principles that mean the most in our lives: our families, our friends and our profession.

***We are the kindling...let's build a fire one new member at a time that will continue to grow and support CLSs for many years to come.***

Warmest regards from CAMLT to you and yours.

Sincerely,  
*Ilene Dickman*  
President, CAMLT

CAMLT/NEWSLINE

Volume 42, No.4  
Ilene Dickman, President

Editorial correspondence should be addressed to CAMLT/ *Newsline*, 39656 Mission Blvd., Fremont, CA 94539-3000.

Scientific articles submitted for publication in the CAMLT/ *Newsline* should be approximately 1,000 words in length or about three pages, double spaced, typed materials. Please include references when appropriate. Since the articles are relatively short, the editors do not feel that an abstract is necessary. All articles should be accompanied by a picture of the author.

Articles describing procedures should include materials and methods as well as results. All graphs and charts should be reducible. Abbreviation (except for those in common scientific usage) should be defined and introduced parenthetically when first used in text.

Advertising correspondence should be addressed to 39656 Mission Blvd., Fremont, CA 94539-3000, (510) 792-4441, FAX (510) 792-3045, e-mail: office@camlt.org.

Copyright California Association for Medical Laboratory Technology. Permission to reprint any part of this publication must be obtained in writing from: NEWSLINE, CAMLT, December, 2016.



May the peace and joy of this holiday season be yours through the New Year.

CAMLT Board of Directors 2016-17

# CAMLT POLITICAL UPDATE

By Public Policy Advocates, LLC (PPA)

## LEGISLATURE

The California Legislature's final day and night of the 2015-2016 two-year legislative session ended August 31. The final gavel fell *sine die* on the session after the introduction of over 5000 proposed laws, resolutions and constitutional amendments. In the last month of the session, the legislature sent over 700 bills to the Governor. He had until September 30 to sign or veto. The PPA/CAMLT agenda was dominated by optometrists wanting to expand their scope of practice to, among other things, order and perform waived lab tests without a lab director; Theranos wanting to allow anyone to obtain any test and test result without physician's order; a key legislator wanting to dismantle Lab Field Services (with the unintended consequence to water down or eliminate lab personnel standards) because, while LFS is sitting on \$12 M in licensing fees, according to the State Auditor General, it is not carrying out its inspection mandates; and Grifols and plasma centers wanting non-qualified personnel to do moderate complexity testing on plasma using the Reichert Protein Analyzer. PPA thwarted these attempts. Without CAMLT, there could/would have been different outcomes. In addition, PPA monitored a cross-section of bills from nursing to HIV; from bioanalysts to clinical laboratories to reciprocity.

This session was not unlike every other over the 20 plus years that we have represented CAMLT. Though California requires higher laboratory personnel standards and requires licensing, every legislative session is marked by other allied health professions trying to expand their scope of practice to perform laboratory tests without the requisite education or lab director—pharmacists, primary care clinics, naturopaths, optometrists and chiropractors for starters. Without CAMLT, these many attempts to dilute or repeal laboratory and laboratory personnel licensing law would have succeeded.

The new era of term limits began to take shape. In 2012, voters agreed to relax term limits to allow up to 12 years in either house of the legislature. These new lawmakers have become a major force. The longer terms mean that legislators can stay engaged in driving how policy turns out. Assembly Speaker Rendon (D-Paramount) has the potential of serving longer than any speaker in the last 20 years—since Willie Brown who served as Speaker for 14 years. However, with this being an election year, at least 14 Assembly Members and six Senators are termed out. With the election of new legislators, we always see new legislation carried to dilute California laboratory law. We can well assume that the optometrists will be back next year.

## WHAT DOES THIS MEAN FOR CAMLT?

For more than 75 years, CAMLT has successfully defended laboratory standards to protect patients as others have tried to convince legislators to dilute licensing and personnel standards. CAMLT membership is critical. CAMLT must be strong financially and in membership numbers to effectively execute a legislative program and to educate key legislators and government officials. CAMLT is the only professional organization that exclusively protects the legislative interests of CLSs, MLTs, CPTs and other laboratory personnel in the best interest of the patient and the laboratory profession. It is the **only** professional association representing clinical laboratory science personnel that retains a lobbying firm in Sacramento to be the voice for clinical laboratory personnel in Sacramento before the legislature and state government.

Organized labor has been extremely helpful in the past. But labor unions also represent chiropractors, optometrists, and pharmacists—the very professions at the forefront of diluting California laboratory law. This has now fallen almost exclusively to CAMLT to protect. Other laboratory personnel professional associations may provide continuing education or fellowship—but none have a Sacramento presence or help to financially underwrite CAMLT's governmental program

on behalf of the entire profession.

### **RECRUIT NEW CAMLT MEMBERS!**

This has been a very rigorous and active legislative session in terms of bills legislating a frontal attack on the laboratory profession. Only you can ensure the growth and vibrancy or a strong, well organized CAMLT. Rise to the challenge. Recruit members to **your** professional organization - CAMLT. Contribute to **your** Lab-PAC. Meet with **your** legislators. Ensure the best possible patient safety in laboratory testing, and preserve **your** important profession.

### **LEGISLATION**

The following is a partial list of key legislation that PPA tracked or lobbied on behalf of CAMLT for the 2015-2016 session. Check the website at [www.camlt.org](http://www.camlt.org) for updates on bill status, Legislator lists, and Committee assignments.

#### **SB 622 (Hernandez) Optometry, as amended 6/22/16 – NEUTRAL**

- Amends the current language with regard to diabetes testing to allow optometrists to collect blood specimen by the finger prick method

SB 622 was initially introduced as a vocational nursing bill, and was amended to deal with optometry and scope of practice expansion. Similar to SB 492 (Hernandez) which died on the Assembly Floor last session, SB 622, if passed, would expand the scope of practice for optometrists to include expanded ability to order and perform the Clinical Laboratory Improvement Amendments (CLIA) waived tests, use noninvasive, nonsurgical technology to treat a condition authorized by the Optometric Act, perform laser and minor procedures, and administer certain vaccines. This bill was amended on June 22, 2016 to return it to existing law with regard to clinical laboratory testing. At which time, CAMLT removed its opposition and changed its position to neutral. SB 622 was scheduled to be heard in the Assembly Business and Professions Committee on June 28 but was canceled at the request of the author and subsequently died.

#### **SB 1418 (Lara) Clinical Laboratory Testing, as amended 4/13/16 – OPPOSE**

- Would allow persons to order **any** laboratory test on themselves without a health care provider's request on a direct access basis
- Test results will not be interpreted by a health care provider or considered along with clinical history that may lead to misinterpretation, misdiagnosis or even death

Existing law authorizes a person to request, and a licensed clinical laboratory or public health laboratory to perform specified clinical laboratory tests, including pregnancy, glucose level, cholesterol, and occult blood tests, as well as authorize a registered clinical laboratory to perform these tests if the test is subject to a certificate of waiver under the Clinical Laboratory Improvement Amendments of 1988 and the laboratory has registered with the State Department of Public Health. SB 1418 would have repealed those provisions and allowed a person to request, and a licensed clinical laboratory or public health laboratory to perform, any laboratory test that the laboratory offers to the public on a direct access basis without a health care provider's request. SB 1418 was sponsored by Theranos. SB 1418 was set to be heard in Senate Business and Professions but after the urging from CAMLT, was pulled at the request of the author, Senator Lara.

#### **AB 1774 (Bonilla) Clinical Laboratories: Licensure, as introduced 5/11/16 – OPPOSE-UNLESS AMENDED**

- This bill repeals the requirements for a clinical laboratory to be licensed or registered by LFS, including the licensing fee
- If lab facilities are not licensed by the state, LFS cannot effectively hold the owners and lab directors responsible for violations of California lab laws including the hiring of unlicensed personnel to perform laboratory testing

Current law provides for the licensure,

registration, and regulation of clinical laboratories and various clinical laboratory personnel by the State Department of Public Health. AB 1774 would repeal the laws regarding requiring a clinical laboratory to be licensed and inspected by Laboratory Field Services, including the licensing fee. PPA worked with the Author and staff seeking three specific amendments, viewing this measure as “throwing the baby out with the bath water.” The Author took two of the three amendments. We remained opposed unless amended, while we continued to address the third desired amendment. AB 1774 passed its policy committee hearing and was referred to the Assembly Appropriations committee, where it was sent to the Appropriations Suspense File. The bill did not advance out of committee.

### **HAVE YOU MET WITH YOUR LEGISLATORS? IF NOT, WHY NOT?**

For the last seventy-five years, CAMLT has continued to successfully weather advertent or inadvertent legislative assaults on clinical laboratory testing that would jeopardize patient safety, but these assaults continue. **It is critical that CAMLT build its membership and engage with and educate California’s elected officials.** Legislators are eligible to serve up to 12 years under our new term limit law. It is imperative to build “legislative champions” for clinical laboratory science and the patients who rely on educated, qualified laboratory personnel for accurate and reliable testing results.

Have you met with your legislators? They are at home in their districts until January. Make sure to educate your elected officials about clinical laboratory issues! Meet with your legislators in your district, send letters explaining CAMLT’s philosophy, invite legislators and their staff to tour your laboratories, and introduce yourself as a constituent. The sponsors of legislation, such as optometrists and chiropractors, to expand their scope of practice into area of clinical laboratory testing are well heeled and well organized. It is imperative that CAMLT members engage in

the process that affects the CLS profession.

- **Which Legislator represents your home or laboratory?** Visit the CAMLT website for a current roster of Legislators and the cities they represent.
- **Visit their offices.** Make an appointment with your Legislators’ District offices.
- **EDUCATE!** Explain to Legislators and their consultants what it takes to be a CLS, MLT or CPT; what you do; why it is important to maintain the integrity of the Laboratory Director when other personnel are doing laboratory tests, even if they are waived; why other allied health providers shouldn’t be Laboratory Directors; the laboratory personnel shortage and what it takes to eliminate it.

**Make it a priority to meet with your Legislators.** Remember, these interactions are integral components of **your** grassroots program. For tips, please refer to the **CAMLT Grassroots Guide** on the website and Talking Points with Legislators section in this issue.

### **TALKING POINTS WITH LEGISLATORS**

**Purpose:** It is imperative to educate legislators about clinical laboratory science and the patients who rely on educated, qualified laboratory personnel for accurate and reliable testing results before bills effecting laboratory science are heard in committee or voted on. We want legislators to come to CAMLT first to access the impact of bills to the quality of patient test results before bills are introduced or amended.

- **Who is CAMLT?**
  - The **California Association for Medical Laboratory Technology** is a voluntary, not-for-profit professional organization representing dedicated laboratory professionals throughout the State of California.
- **Our mission**
  - Part of CAMLT’s mission is to maintain and improve high quality in laboratory testing by fostering education and working to ensure that legislators understand the impact of new bills in maintaining high quality laboratory

results.

- **What is a clinical laboratory test?**
  - Laboratory tests take human biological samples such as whole blood, urine, spinal fluid and other body fluids and perform various analytical tests ranging from urine pregnancy through DNA analysis requested by physicians.
- **Why is it important to maintain high quality laboratory tests?**
  - Over 80% of clinical and diagnostic decisions are based on the results of laboratory testing.
  - Accurate and timely laboratory test results directly correlates to with better patient outcomes.
  - Maintaining the integrity of the lab personnel standards is essential for accurate and timely laboratory test results.
- **Who works in the laboratory?**
  - Laboratory Tests are classified as waived, moderate, or high complexity based on the necessary skill and educational level of the testing personnel needed to perform a particular test.
  - Most testing personnel are Clinical Laboratory Scientists (CLS) who have at the minimum, a bachelor's degree and have completed a post-graduate training program in a DPH (Dept of Public Health) approved laboratory. After passing a licensure examination, they perform waived, moderate and high complexity laboratory testing, including analyzing body fluids, cells, and tissue samples. A CLS must maintain instruments to assure the highest level of accuracy. They supervise unlicensed staff, phlebotomists and Medical Laboratory Technicians (MLT). The CLS manages daily activities, direct quality assurance, finances, and technological improvements in the laboratory. In addition, the CLS may direct waived laboratories.
- **Who represents CAMLT in Sacramento?**
  - Public Policy Advocates (PPA) engage the legislature on CAMLT's behalf.

## **STRENGTHEN YOUR VOICE: CONTRIBUTE TODAY!**

Please donate to the CAMLT Lab-PAC fund. Lab-PAC is a **critical** means of supporting and electing Legislators to the California Legislature who share a like-minded philosophy with CAMLT and who are open-minded to learning the issues and challenges facing your profession. Encourage the colleagues you work with. Get your chapters and chapter members to contribute. Talk to your vendors. Get involved! Your voice in the political process is much louder as CAMLT than as an individual. Contribute to the collective resources of CAMLT to grow your political clout. Visit the **Lab-PAC Page** to donate online or for a donation form. **Your gift in any amount will help your profession. Contribute now!**

**Please mail donations made payable to:**

**CAMLT LAB-PAC  
39656 Mission Blvd,  
Fremont, CA 94539**

**Please write a check to LAB-PAC  
or  
donate online now!**



## Student Awards Delight Surprised Recipients

During the Student Forum at the 2016 CAMLT Convention in Pasadena, eight fortunate CLS Trainees learned that their names had been chosen in the annual drawing for Student Scholarships awarded by the Education and Research Foundation.

All student members from approved training programs are eligible for the drawings held each year in the fall. For 2016 the three Clinical Laboratory Internship Awards of \$500 were given to: **Kevin Aure**, CLS Trainee at Long Beach Memorial Hospital, **Jingxuan Dong**, CLS Trainee at Kaiser Permanente Reference Laboratory in North Hollywood, and **Christina Irikyan**, CLS Trainee at Cedars-Sinai in Los Angeles.

The five Student Stipend Awards of \$100 were given to: **Dennis Maniago**, **Guo Jian Wen** and **Annabel Lee**, all students in the CSU Dominguez Hills CLS Training program, and to **Patrick Soliven** and **Kristine Zabala**, students in the UC San Diego CLS Training program.

Congratulations were offered to these students and to all who are working to become Clinical Laboratory Scientists in California. CAMLT welcomes all the new members of the laboratory family.

Ilene Dickman, CAMLT President, interviewed **Kevin Aure** after the presentation. Kevin was very surprised and pleased to hear of the award. He said he felt very welcomed by the educators and CAMLT leaders present at the Student Forum and found the speakers inspiring. Kevin had just started his training at Long Beach Memorial. His degree is from CSU Dominguez Hills.

**Jingxuan Dong**, was also delighted to have received the award. Jingxuan is originally from northern China, and had worked first as a laboratory assistant before entering the CLS training program. She is training at Kaiser Permanente in the Microbiology department.

**Once again, congratulations to our student members. CAMLT hopes this year of student membership will lengthen into an active relationship which will bring benefits to members and to our lab community.**



# **2016 CAMLT CONVENTION: POWER THROUGH PROFESSIONALISM**

*aka: The Party in Pasadena!*

CAMLT's Annual Meeting for 2016 was held at the Pasadena Hilton, September 16 through 18. Beautiful fall weather greeted attendees for a busy three days of workshops, meetings, exhibits, and social events. Over 400 registrants, students, exhibitors and speakers filled the meeting spaces. The chance to talk with our peers is always a highlight of the Convention. As always, CAMLT and the 2016 Convention Committee offer sincere thanks to our Sponsors, who are listed on page 9.

The **Workshop** selections were outstanding, with offerings in every laboratory discipline from speakers who are experts in their fields. A sampling of topics: "Overview of Allergy Medicine: Diagnostic Approach in Primary Care Testing", by Monet Sayegh, MD; "Technical Advances Revolutionizing the Role of HLA in Medicine" by Lee Ann Baxter-Lowe, PhD; a pair of topics – "Screening for Gestational Diabetes Mellitus: Challenges and Controversies" and "The Clinical Chemistry of Pregnancy" by David G. Grenache, PhD; "Hot Topics in Microbiology! Zika, *C. difficile*, and Antimicrobial Stewardship" by Margie Ann Morgan, PhD; and a thorough coverage of coagulation theory and practice, from pre-analytical variables through setting up new testing to a session on "Laboratory Diagnosis of von Willebrand Disease" presented by Larry J. Smith, PhD.

**Workshop sponsors** included Siemens Healthcare Diagnostics, Sebia, Inc., Diagnostica Stago Inc., Bio-Rad Laboratories, Greiner Bio-One North America, Inc., Instrumentation Laboratories, ARUP Laboratories, Inova Diagnostics, BioFire Diagnostics, LLC, Roche Diagnostics Corporation, Sysmex America, Inc., and Abbott Diagnostics and Abbott Hematology Divisions.

The **Student Forum** on Friday afternoon brought together over 100 CLS students from programs throughout California with educators, CAMLT leaders and guests. Cheryl Jackson Harris, Chair, Clinical Sciences, CSU Dominguez Hills, led the Forum. Students had been invited to present poster sessions or power-point lectures on their research projects. Nine presentations were given, with time for questions from the audience. Payman Nasr, Assistant Professor, Clinical Sciences CSUDH, acted as judge and announced the best in each class. Diana Mass, President of Associated Laboratory Consultants, was the Keynote Speaker. Her topic was "Empowerment: Maintaining Your Self-Esteem and Peak Performance". Officers of the CAMLT Education and Research Foundation announced the fortunate students whose names were drawn for E&R's student scholarships. (See page 7.)

The **Annual Meeting of the House of Delegates** convened on Saturday to conduct Association business, elect new officers and discuss recent changes for CAMLT, including hiring a marketing firm, Urban Dynamics, Inc., who have spearheaded the redesign of CAMLT's web site and are beginning a marketing campaign to grow membership and encourage retention. Russ Noack, of Public Policy Advocates updated the delegates on recent legislative issues, and Ann Tonini and Dora Goto reported on the activities of the Governmental Affairs Committee for the year.

The **LAB-PAC Luncheon** featured Anthony Portantino, then a candidate for California State Senator from La Cañada-Flintridge. Mr. Portantino served in the California Assembly for six years, from 2006 until 2012, where he established himself as a passionate supporter of education and an independent leader who tries to put policy ahead of politics. He is known as the author of the bill which established the California Umbilical Cord Blood collection program. His remarks were amusing as well as informative. (He won the election in November.)

**Social Events:** Saving the best for last – the **party** part of the proceedings:

Improvisational theater group Cold Tofu made **Fun Nite** a very entertaining evening. Using scenarios called out by the audience, the four group members came up with hilarious scenes, and even put the audience on stage in several of the skits. A delicious buffet dinner preceded the entertainment.

The **Installation Banquet** brought the weekend to a close with good food, good friends, a few short speeches and lots of good cheer. **CLS of the Year, Cheryl Jackson Harris**, appeared to be really surprised by the award, which all agreed was much deserved. Having her daughter appear from behind a pillar, where she had been hiding in plain sight all evening, to add her congratulations was an extra bonus.



Abbott Diagnostics



## 2016 Convention and Speaker Sponsors THANK YOU!!



Abbott Diagnostics  
 Abbott Hematology  
 ARUP Laboratories  
 BioFire Diagnostics  
 Bio-Rad Laboratories  
 Chrono-log (Silver Sponsor)  
 Diagnostica Stago, Inc.  
 Greiner Bio-One  
 Hologic (Silver Sponsor)  
 Inova Diagnostics  
 Instrumentation Laboratory  
 Quest Diagnostics  
 (Platinum Sponsor)  
 Roche Diagnostics  
 Ruben Bonilla-Guerrero, MD  
 Sebia



Siemens Healthcare Diagnostics  
 Sysmex America, Inc.



Eastbay Chapter  
 Eastland Chapter  
 Fresno Chapter  
 South Bay Chapter  
 Tulare Kings Chapter







## CAMLT LAB-PAC

Consider a donation to LAB-PAC. Through LAB-PAC you can help support candidates for state legislature who are in tune with the issues facing clinical laboratory science. A contribution to LAB-PAC insures that your voice is heard. Your voluntary contribution, when added to the contributions of others, makes a real difference.

The annual CAMLT LAB-PAC "Share the Wealth" Fundraiser and Drawing takes place during the CAMLT Annual Meeting. Tickets are available all year round at State Seminar Events and at some Chapter Seminar Events. 50% of all ticket sale proceeds go toward prizes:

**First Prize:** 30% of total proceeds up to a maximum of \$3,000

**Second Prize:** 15% of total proceeds up to a maximum of \$1,500

**Third Prize:** 5% of total proceeds up to a maximum of \$500

The 2016 LAB-PAC "Share the Wealth" Drawing winners are:

|                      |                       |
|----------------------|-----------------------|
| <b>First place:</b>  | <b>Rita O'Leary</b>   |
| <b>Second place:</b> | <b>Susan Bartlett</b> |
| <b>Third place:</b>  | <b>John Burke</b>     |

Congratulations to all the winners!



Ilene Dickman, Anthony Portatino and Russ Noack at the LAB-PAC Luncheon.



Cheryl Jackson-Harris, Kathleen Doty and Dora Goto drawing the LAB-PAC Share the Wealth winners.



## California CLS/MLT Licensure Examination Review Seminars 2017\*\*

This program was initially held in 2004 and repeated in 2005-16. Evaluation of the California CLS and MLT exam results show that participants in our review classes passed the exam at significantly higher rates than historical passing rates. Therefore, CAMLT will be presenting review sessions in 2017. These seminars are directed toward persons preparing for the California CLS or MLT licensing and/or certifying examinations and licensed individuals in need of a comprehensive review.

*This review seminar is not eligible for continuing education credit for current licensees.*

| Dates   | Presentation Location  | Time                     | Cost  |
|---|--|--------------------------|---|
| February 11, 12, 25, 26 &<br>March 11, 12<br>Sat & Sun  | John Muir Medical Center<br>(Concord)<br>2540 East Street<br>Concord, CA | 8:30am - 6pm<br>all days | \$80 per day<br>or<br>\$395 for all 6<br>days |
| August 12, 13, 26, 27 &<br>September 9, 10<br>Sat & Sun | John Muir Medical Center<br>(Concord)<br>2540 East Street<br>Concord, CA | 8:30am - 6pm<br>all days | \$80 per day<br>or<br>\$395 for all 6<br>days |

Additional information, exact locations of seminars, seminar abstract, registration forms, and related educational/course material for purchase are updated regularly at [www.camlt.org](http://www.camlt.org) and click on the Education and then Examination Review Seminars course link.

**\*\*Sponsored in part by: John Muir Health**

### **E&R Scholarships Awarded in 2016**

Throughout the year, CAMLT's Education and Research Foundation awards membership and student scholarships. We are pleased to announce the winners for the 2016 year:

Membership awards of a full-day certificate for continuing education at a CAMLT Seminar were given to:

Lisa Woo  
Yenovk Adjoyan  
Christine Delaney-Enos  
Greg Ford

Eleanor Kelley Membership Award, also a CE certificate to:

Mary Ann Merritt  
Kathryn Sakai  
Michael Corby

Ruth Baldwin Award, a one year active membership, to:

Lynette Sawyer

Student recipients of E&R Awards are listed on page 7.

# Prion Diseases

Course Number DL-983

1.0 CE

Level of Difficulty: Intermediate

Rebecca A. Rosser, MS, MBA, CLS, MT(ASCP)  
DLM

Education & Development Consultant – Laboratory

Kaiser Permanente

SCPMG Regional Reference Laboratory

North Hollywood, CA

## Objectives

After completion of this course the participant will be able to:

1. define Transmissible Spongiform encephalopathies
2. discuss prions
3. describe animal TSE including Scrapie, Chronic Wasting Disease, and Bovine Spongiform Encephalopathy
4. describe human TSE including Kuru, Gerstmann-Straussler-Scheinker Disease, Fatal Familial Insomnia, Alpers' Disease, Creutzfeldt-Jakob Disease, and variant Creutzfeldt-Jakob Disease
5. describe sterilization and disinfection practices

## Introduction

The headlines in Britain shouted messages such as "Bring Back the Beef," and "Scientists baffled by mystery of new BSE cases." In 1985 an epidemic of Mad Cow Disease began devastation in the beef industry in the United Kingdom that jolted the world. BSE cases in the United Kingdom peaked in January 1993 with more than 184,000 cases confirmed by the end of 2010. The disease among the cows was diagnosed as being caused by a transmissible spongiform encephalopathy (TSE), also known as a prion disease and may have been a result of feeding cattle meat-and-bone meal infected with BSE or scrapie-infected sheep products. By February 2015, 4 cases had been identified in the United States and 20 in Canada. TSEs are responsible for a number of animal and hu-

man conditions that were first thought to be caused by a virus. Research has indicated that the causative infectious agent does not contain a nucleic acid genome, therefore cannot be a virus. Others speculate that the agent is a virino, which is a small non-coding regulatory nucleic acid coated with a host-derived protective protein. Still others believe the agent is a prion. In both humans and animals this agent causes progressive brain damage and ultimately death.

Animal TSE can affect cows in the form of Bovine Spongiform Encephalopathy (BSE), also known as "Mad Cow Disease." BSE is most prevalent in the United Kingdom and has caused the government to dispose of hundreds of thousands of infected cattle, causing a crisis in the beef industry. In 1995 a few cases of TSEs began appearing in young adults in England. These cases were a variant of Creutzfeldt-Jakob Disease and were ascribed to eating infected meat from BSE cattle. Other TSEs are found in animals as well as in humans. While these diseases, in humans, are rare, they are always fatal.

Control measures, such as surveillance, culling sick animals and banning cattle over the age of 30 months, have been put into place to prevent potentially infected tissue from entering the human food supply. In addition, restrictions are in place on the importation of live cattle, sheep and goats from countries where BSE is known to exist.

## Transmissible spongiform encephalopathies (TSE)

TSEs are also known as prion diseases. The prion (proteinaceous infectious particle) is a normal protein that has a change in its three-dimensional configuration. As the prion attacks the brain it induces abnormal folding of the prion proteins which causes large vacuoles in the cortex and cerebellum, resulting in the spongiform appearance. The normal protein (PrPc) is a glycoprotein with secondary structures dominated by alpha helices, easily soluble and easily digested by proteases. The abnormal, disease-producing prion (PrPsc) is a glycoprotein with secondary structures dominated by beta helices,

insoluble in all but strong solvents, and resistant to digestion by proteases. When PrPsc molecules come in contact with PrPc molecules, the PrPc molecule is converted into the PrPsc molecule. As this process occurs, the molecules form aggregates that might be the cause of the cell damage that results in vacuole formation.

Prion disease may be acquired through one of three routes. First, when the disease has no known apparent cause, it is called sporadic. Second, the disease may be inherited through an autosomal dominant trait, and third, the disease may be acquired through infected food, homografts, or medical equipment. Prions appear to be resistant to enzymes, chemicals and heat that break down other proteins. Normal disinfection procedures do not eliminate prions either. In addition, they are extremely resistant to high doses of ionizing and ultra-violet irradiation with some residual activity remaining in the environment. In 2000, the World Health Organization developed recommendations on the safest and most unambiguous method for ensuring that there is no risk of residual infectivity on contaminated instruments. The recommendation is for incineration of all disposable instruments, material, and wastes, and is the preferred method for all instruments exposed to highly infected tissues. For non-disposable instruments, pretreatment by immersion in sodium hydroxide followed by heating in a gravity displacement autoclave is required prior to routine sterilization. For surfaces and heat sensitive instruments, flood with 2N sodium hydroxide for 1 hour and then rinse. Dry goods can be immersed in sodium hydroxide followed by heating in a porous load autoclave.

All TSEs, human and animal, have long incubation times and do not induce an inflammatory response. They are not known to spread from human to human, but transmission can occur through exposure to infectious materials during invasive medical procedures. Exposure to human cadaveric-derived pituitary hormones, dural and cornea homografts, and contaminated

neurosurgical instruments has been documented to cause infection. Formalin and glutaraldehyde-fixed TSE tissue retains infectivity for long periods, if not indefinitely, consequently the same precautions should be used with this type of tissue as with fresh material.

### **Prion Diseases**

Animal:

Scrapie

Chronic Wasting Disease

Bovine Spongiform Encephalitis

Feline spongiform encephalitis

Transmissible mink encephalitis

Human:

Kuru

Gerstmann-Straussler-Scheinker Disease (GSS)

Fatal Familial Insomnia (FFI)

Alpers' Disease

Creutzfeldt-Jakob Disease (CJD)

Variant Creutzfeldt-Jakob Disease (vCJD)

### **Animal Diseases**

#### **Scrapie**

More than 250 years ago, Scrapie was recognized as a disease in sheep and goats in Western Europe. In 1947, the first case was identified in the United States in a flock of British origin. Since then more than 1,000 flocks in the U.S. have been diagnosed with Scrapie. As with the other prion-caused diseases, Scrapie is a fatal, degenerative disease affecting the central nervous system. In the U.S., it has been reported in the Suffolk breed of sheep, along with over a dozen other breeds and some crossbreeds. As of October 2003, 2,350 cases in sheep and 127 cases in goats have been diagnosed.

Transmission is mainly from the ewe to her offspring through contact with the placenta and placental fluids. The incubation period is two to five years with the sheep living one to six months after symptoms appear. There is no evidence that Scrapie is transmittable to humans. Early signs of Scrapie include slight changes in behavior or temperament, followed by scratching or

rubbing against fixed objects. This rubbing phenomenon is how the disease was named Scrapie. Other symptoms include loss of coordination, weight loss, hopping like a rabbit and swaying of the rear end. Diagnosis is made based on the animal's physical symptoms, the animal's history and finally by exam of brain tissue. Diagnostic testing has been developed by the USDA's Animal and Plant Health Inspection Service for the detection of Scrapie in live animals. The tests are performed at the National Veterinary Services Laboratory and require brain or lymphoid tissue [lymph nodes, tonsil, third eyelid, or rectoanal]. Abnormal prion protein can be detected by using enzyme-linked immunoabsorbent assays, western-blot or immunohistochemistry.

Increased concern over this disease has caused packers and producers to have difficulty in disposing of sheep offal and dead sheep, causing increases in disposal costs. In addition, other countries are hesitant to purchase sheep products from the U.S. Control programs are focusing on developing a diagnostic test, investigating transmissibility, and providing effective cleanup strategies that are economic for packers and producers.

### **Chronic Wasting Disease (CWD)**

North American deer and elk are the target of this TSE. It was first discovered in Colorado in the mule deer population and manifested itself as a "wasting" syndrome, resulting in severe weight loss and consequent death. CWD has spread outside the endemic zone of Colorado and Wyoming, including small areas in New York, West Virginia, and Wisconsin. The present range includes eleven states and two Canadian provinces and is expected to grow. The disease has also been diagnosed in farmed elk herds in South Dakota, Nebraska, Oklahoma, Montana, Kansas, and Colorado. These herds have undergone quarantine and no further disease has been identified. CWD has infected Rocky Mountain elk, mule deer, white-tailed deer, and moose. There is no evidence that this disease has been passed to other ruminant animals, such as cattle,

sheep, and goats. CWD occurs mostly in adult animals. Symptoms include not only weight loss over time, but also decreased interaction with other animals, listlessness, and repetitive walking in a set pattern. Nervousness may also be exhibited in elk. A decreased appetite for hay and increased drinking have been observed.

Transmission of the disease is thought to be from animal to animal in feces, urine, or saliva, or may occur through birth. There is also evidence that it can be spread through exposure to prions in the environment. The incubation period is approximately 16 months. Natural movement of wild deer and elk contribute to the spread of CWD. Currently researchers are in the process of developing a live-animal diagnostic test. Early results of research using tissue from deer tonsils may lead to a viable test but appears not to work for elk. As in other spongiform diseases, brain lesions occur and current diagnosis is made after the animal has died. Prevention of CWD is by elimination of infected animals and limiting the distribution of the disease to the endemic area for free-range animals and surveillance of farm raised animals. Hunters should contact state wildlife officials to avoid endemic areas. Precautions to be taken when field-dressing these animals include using gloves, boning-out the meat from the animal, and minimizing handling of the brain and spinal cord. Other efforts to decrease CWD include adopting regulations regarding the transport of hunter-harvested deer and elk carcasses out of known CWD areas, reducing the density of the animals, halting interstate movement of herds and federal legislation for funding for CWD research.

### **Bovine Spongiform Encephalopathy (BSE) or Mad Cow Disease**

In 1985, an epidemic began in England; before it was under control over 200,000 cattle were stricken with BSE in Britain and Europe, crippling the British livestock industry. "Mad Cow Disease" is aptly named due to the behavior exhibited by the cattle when they are infected. The origin of the disease appears to be cattle feed that con-

tained Scrapie infected sheep brain tissue that had been treated in a new way that did not destroy the infectiousness of the Scrapie prions. Yes, the sheep Scrapie had crossed over into the cattle population. In addition, waste cattle (presumably contaminated) were also ground up for feed. In 1988, such food was banned, but it took until 1993 for the epidemic to decline, due to the incubation period of three to eight years.

The epidemic in cattle peaked in January, 1993 at 1,000 new cases per week. British agricultural officials took a series of actions to eradicate BSE, making BSE a notifiable disease, prohibiting the inclusion of ruminant-derived proteins in ruminant feed, and preemptively destroying over four and a half million asymptomatic cattle over 30 months of age. As a result of these actions the epidemic markedly subsided and now few animals are diagnosed with the disease.

BSE had not been shown to exist in the United States. This was due to the banning of use of ruminant feed in 1997. However, in 2003 a cow infected with BSE was found in Washington State. This cow was traced back to an import from Canada. Since that time, two cases that appear to be endemic have been identified in Texas and Alabama. Additional cases have been confirmed from a dairy cow in California in 2012 and a Canadian cow in 2015, despite efforts to ban feeds that contain BSE infected tissues. Two strains of BSE have been identified, typical BSE and atypical BSE, which may occur spontaneously.

## **Human Diseases**

### **Kuru**

Kuru is a prion disease that was discovered in the early 1900s in the people of New Guinea. The disease manifests itself as a neurodegenerative disorder starting with unsteadiness, deterioration of speech, and tremor. It then moves on to cause more severe tremors, shock-like muscle jerks, and uncontrolled bursts of laughter. In the final stage, all the symptoms become severe, and difficulty in swallowing and inability to feed oneself lead to starvation. The incubation

period for Kuru was determined to be from 2 years to 23 years from exposure. The disease reached epidemic proportions in the 1960s after five decades of neurological disease and death, mostly in the female population. So, how did this group of natives acquire this devastating disease? In this part of New Guinea there was a ritual of mortuary cannibalism. The females would remove organs of the dead, which were then used as food sources, especially for children and the elderly. Fortunately for these natives of New Guinea, this practice has been eliminated from the culture. With the elimination of this practice, the disease has disappeared in New Guinea.

### **Gerstmann-Straussler-Scheinker Disease (GSS)**

GSS Disease is an inherited neurodegenerative disorder caused by an accumulation of a mutated prion protein amyloid. It is inherited as an autosomal dominant disease, which means that both sexes are affected and there are no carriers of the mutant gene. GSS slowly progresses with symptoms beginning between the ages of 30 and 70. Patients experience lack of muscle coordination and have difficulty walking. As the disease progresses, symptoms include slurring of speech, involuntary movements of the eyes, rigid muscle tone and eventually dementia, which is less common than in Creutzfeldt-Jakob Disease (CJD). In some cases, the disease progresses rapidly and consequently cannot be distinguished from CJD. In GSS, spongiform changes in the brain tissue may or may not occur. Patients with GSS can live from 2 to 10 years with treatment aimed at alleviating symptoms. Currently there is no cure for this rare inherited disease. Current research is focused on the prion that causes the disease, attempting to characterize it, clarify the disease mechanism, and then developing ways to prevent, treat, and cure GSS disease.

### **Fatal Familial Insomnia (FFI)**

FFI is a rare autosomal dominant hereditary disease caused by a prion that results in amyloid plaques that affect the thalamus, causing severe selective atrophy.

The thalamus is a center in the brain that is responsible for regulation of sleep. As a result of the degradation of the thalamus, there is an interruption of the body's circadian rhythms. Consequently, patients with FFI lose sleep, can hallucinate, and eventually go into coma, with death in about 18 months. The age of onset ranges from 30 to 60. The four stages of FFI are:

- Progressive insomnia, panic attacks, and bizarre phobias developing over a four-month period characterize the first stage.
- The second stage lasts about five months with symptoms including hallucinations, panic, agitation, and sweating.
- In stage three, total insomnia is paired with weight loss and lasts about three months.
- The final stage, which lasts six months, includes dementia, total insomnia, loss of hearing and sudden death.

Genetic testing is available to make an early diagnosis, as the disease does not begin progression until after child bearing years. Currently there is no cure for this disease, but gene therapy could be promising to prevent FFI. In this case, the correct gene could be inserted to cause the correct protein to be developed, consequently allowing for the thalamus to function normally, thus preventing insomnia and subsequent deterioration.

### **Alpers' Disease**

Unfortunately, Alpers' Disease affects infants and children. It is an autosomal recessive disorder that can be seen in siblings and is known also as Christensen's disease or Christensen Krabbe disease. Alfons Jakob first recognized it in the early 1900s and his students, Souza, Freedom, and Alpers further described cases. It is manifested by convulsions, developmental delay, mental retardation, and dementia. Only thirteen cases have been identified since 1931, but others may have been missed due to chronic liver dysfunction being present, which may mask diagnosis of Alpers' Disease. Liver

failure is usually the ultimate cause of death within the first two years of life. Final diagnosis is at autopsy when spongiform plaques are identified in the gray matter of the brain. There is no current treatment for the disease, only for the symptoms, such as anti-convulsants for the seizures.

### **Creutzfeldt-Jakob Disease (CJD)**

CJD is also referred to as subacute spongiform encephalopathy due to the formation of microscopic vacuoles or holes in the neurons that appear "sponge-like." The disease is named for Drs. Hans Creutzfeldt and Alfons Jakob who documented the first cases in the 1920s. This disease affects both men and women in the 50- to 75-year age range, with one case per million per year. Cases in persons under 30 years of age are extremely rare, with fewer than 5 cases per billion. A person can acquire CJD in one of three ways. Firstly, the disease can appear sporadically, without any apparent cause. Secondly, it can be inherited as an autosomal dominant pattern. This type of transmission occurs in about 10-15 % of the cases. Thirdly, an infectious agent can transmit the disease. Iatrogenic transmission is an unintended consequence of a medical procedure using instruments tainted by contaminated human growth hormone (about 100 cases), by corneal grafts from asymptomatic infected individuals, or by infected neural material. In 1976, more stringent sterilization procedures were put into place.

Additionally, recombinant DNA technology is now used for producing human growth hormone. Because of these advances, no further documented cases of CJD have occurred from iatrogenic transmission. There are no known instances of transfusion-related CJD.

Symptoms begin with insomnia, depression, confusion and problems with memory, coordination, and sight. As the disease progresses, patients experience progressive dementia and involuntary jerking movements. In the final stages of the disease, patients lose all mental and physical functions, lapse into coma, and die, usually from pneumonia due to the unconscious state. CJD patients

will succumb within one year of diagnosis. There are no known effective treatments for CJD, so treatment focuses on easing symptoms.

CJD is difficult to diagnose, so the first step is to rule out other diseases that might have similar symptoms. It may be mistaken for Alzheimer's disease, Pick's disease, Huntington's disease, cerebral hematomas, and vascular irregularities. An EEG can detect a characteristic abnormal brain pattern associated with the later stages of the disease, but cannot confirm a CJD diagnosis. A new test to detect a specific protein (14-3-3) in cerebrospinal fluid (CSF) has been developed, but again this does not give a definitive diagnosis. CJD can definitively be diagnosed by performing a brain biopsy or autopsy. However, a brain biopsy can be a dangerous procedure, can result in a false-negative result if the wrong area of the brain is chosen, and is quite costly. In addition, there is a risk to healthcare workers if strict sterilization and infection control precautions are not taken. When available, disposable equipment should be used in suspected cases of CJD and then incinerated. If equipment is to be reused, steam sterilization or cleaning with 1 N sodium hydroxide (followed by steam sterilization) can be utilized. If this cannot be accomplished, the equipment must be disposed of by incineration. Contaminated skin surfaces are to be washed with 1 N sodium hydroxide or 10% bleach followed by rinsing with copious amounts of water. Splashes to the eyes may be treated using copious amounts of water or saline. Contaminated dry waste or sharps waste should be autoclaved for 4.5 hours prior to incineration.

### **Variant Creutzfeldt-Jakob Disease (vCJD)**

In 1996, a disturbing fact emerged that showed a causal relationship between BSE and a new disease called variant Creutzfeldt-Jakob Disease (now referred to simply as vCJD). Young adults were dying after exhibiting clinical symptoms

of CJD, including dementia and muscle jerks. Cases were predominately coming from Britain, but several cases were documented from patients outside of Britain. These patients were found to have lived in the British Isles for at least five years during the epidemic (1980-1995). As of June, 2007 there have been 161 deaths in Britain from definite or probable vCJD with four probable cases still alive. Thirty-nine other cases have occurred outside Britain, primarily in France and other European countries that imported meat from Britain. Of the three documented cases in the U.S., two had lived in Britain and one had lived in Saudi Arabia.

The incubation period for vCJD is still unknown. Documented patient incubation times have been six or more years. The current risk of acquiring vCJD from eating beef cannot be determined for travelers to Britain. However, the risk decreases by avoiding beef or beef products or selecting beef or beef products that are solid muscle pieces (versus calf brains or burgers or sausages). Public health preventive measures have been put into place including enhancement of BSE surveillance, culling of sick animals, and using the "over thirty months scheme." This excludes animals over 30 months of age from both the human and animal food chain.

In 2002, there was a case of person-to-person, blood-borne transmission of vCJD. This occurred in a 69-year-old man who had received, six years previously, several units of blood. One of those units came from a 24-year-old donor who developed vCJD three years after donation. Taking into consideration all other factors, the conclusion was made that the recipient indeed did contract vCJD from this donor. Due to the fact that vCJD can be easily detected in lymphoid tissues and the existence of a possible blood phase had led researchers to believe that blood-borne transmission of vCJD was possible.

To date there have been four cases of probable transmission of vCJD by blood transfusion in Britain. The donors developed

CJD 17 months to 40 months after donation. The recipients developed vCJD six to eight years after receiving blood.

There is a donor deferral program in place in the U.S. Permanent deferrals are for anyone who has been diagnosed with CJD or vCJD or are relatives of anyone who has been diagnosed.

An indefinite deferral is in place for anyone who has spent more than three months in the United Kingdom from 1980 to 1996, or anyone who has spent more than five years in Europe from 1980 to present. Indefinite deferrals also apply to anyone who received a blood transfusion in the United Kingdom from 1980 to present.

### **Laboratory Testing**

The National Prion Disease Pathology Surveillance Center was established in 1997 to acquire tissue samples and clinical information from as many cases of human prion disease as possible. There are specific diagnostic activities available within the center. In CSF, they can search for the presence of 14-3-3 protein, a marker of Creutzfeldt-Jakob disease. In DNA extracted from blood, brain, or other tissues, they can search for the presence of a mutation of the prion protein gene and determine the polymorphism at codon 129. This polymorphism is an indicator of host susceptibility and the phenotypical disease expression of familial, iatrogenic or sporadic CJD. Unfixed brain tissue from biopsy or autopsy can be searched for the presence of the abnormal disease producing prion (PrP<sup>sc</sup>). In fixed brain tissue, they can exclude, confirm, and characterize the prion disease by microscopic examination. Only frozen brain tissue examination can confirm or exclude the diagnosis of prion disease.

### **Conclusion**

Transmissible spongiform encephalopathies (TSE) are prevalent in both human and animal populations. Surveillance, along with advances in detection, and prevention are needed to eliminate these prion caused diseases. Research into how prions are

formed and transmitted may be the key to unlocking the mystery. There is no current treatment for prion diseases. Once there is more information about how prions work, treatment modalities may be discovered.

### **References**

1. Akroush, Ann M., Fatal Familial Insomnia. 1996-1997. Available at: <http://www.personal.umd.umich.edu/jcthomas/JCTHOMAS/1997%20Case%20Studies/AAkroush.html>. Accessed January 7, 2008.
2. CDC. About BSE. Available at: <http://www.cdc.gov/prions/bse/about.html>
3. CDC. Prion Diseases. Available at: <http://www.cdc.gov/ncidod/dvrd/prions/index.htm>. Accessed January 7, 2008. Has links to the following: CJD, vCJD, BSE, and CWD.
4. Kuru: the Dynamics of a Prion Disease. Available at: <http://www.as.ua.edu/ant/bindon/ant570/Papers/McGarth/McGarth.htm>. Accessed January 7, 2008.
5. National Institute of Neurological Disorders and Stroke, Alpers` Disease Information Page, Accessed November 15, 2016. Available at: <http://www.ninds.nih.gov/disorders/alpersdisease/alpersdisease.htm>. Accessed January 7, 2008.
6. National Institute of Neurological Disorders and Stroke, Gerstmann-Strussler-Scheinker Disease Information Page, Accessed November 15, 2016. Available at: <http://www.ninds.nih.gov/disorders/gss/gss.htm>. Accessed January 7, 2008.
7. USDA, APHIS, Veterinary Services, National Animal Health Programs. Scrapie. Available at: [http://www.aphis.usda.gov/lpa/pubs/fsheet\\_faq\\_notice/fs\\_ahscrapie.html](http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahscrapie.html). Accessed January 7, 2008

## REVIEW QUESTIONS

Course #DL-983

Choose the one best answer.

1. Kuru disappeared from the native population in New Guinea because
  - a. immunization against the disease was developed
  - b. cow meat for consumption was banned
  - c. mortuary practices were discontinued
  - d. the affected tribe died out
2. The causative agent of transmissible spongiform encephalitis is
  - a. a proteinaceous infections particle
  - b. an abnormally folded nucleic acid
  - c. a vmno.
  - d. an amino acid substitution
3. Which of the following are human prion diseases?
  - a. Scrapie, Kuru, BSE
  - b. Kuru, GSS, FFI
  - c. BSE, GSS, Kuru
  - d. Scrapie, FFI, GSS
4. The main characteristic of vCJD is:
  - a. vCJD attacks young adults
  - b. vCJD attacks natives of New Guinea
  - c. vCJD is inherited
  - d. vCJD has not been identified in the U.S.
5. The best method of dealing with instruments contaminated by prions is
  - a. submerging in 1N sodium hydroxide
  - b. autoclaving
  - c. incinerating
  - d. baking
6. Which prion disease is not inherited?
  - a. Alpers
  - b. GSS
  - c. FFI
  - d. BSE
7. Chronic wasting disease is
  - a. found in elk in California
  - b. causes loss of weight in cattle
  - c. was first identified in deer in Colorado
  - d. is restricted to Wyoming and Colorado
8. Which of the following prion diseases is associated with BSE?
  - a. FFI
  - b. vCJD
  - c. CJD
  - d. GSS
9. Which prion disease affects sheep?
  - a. Scrapie
  - b. Chronic Wasting Disease
  - c. Variant Creutzfeldt-Jacob disease
  - d. Bovine spongiform encephalitis
10. The National Prion Disease Pathology Surveillance Center can test for
  - a. prions in blood
  - b. polymorphism in codon 129 for susceptibility to FFI
  - c. PrPc in brain tissue to identify vCJD
  - d. 14-3-3 protein in CSF, a marker for CJD

**CAMLT DISTANCE LEARNING COURSES** (Revised 8/8/2016)

CAMLT is approved as a provider of continuing education programs in the clinical laboratory sciences by the California Department of Public Health as a CA CLS Accrediting Agency (#21).  
 Permission to reprint any part of these articles, other than for CAMLT credit, must be obtained in writing from the CAMLT Executive Office.

| One-unit (1.0) CE Courses                        |   | Two-unit (2.0) CE Courses                        |   | Three-unit (3.0) CE Courses                      |   |
|--|---|--|---|--|---|
| Course #   | Title   Level of Difficulty                                   | Course #   | Title   Level of Difficulty                                   | Course #   | Title   Level of Difficulty                               |
| Place a check in box next to each course ordered |   | Place a check in box next to each course ordered |   | Place a check in box next to each course ordered |   |
| DL-014   | Zika Virus [ B ]  | DL-010   | MMWR Report - Chlamydia & Neisseria [ A ]                     | DL-012   | Diseases Caused by <i>Fusobacterium necrophorum</i> [ I ] |
| DL-013   | Ebola Virus Disease [ B ]                                     | DL-004   | Viral Hepatitis: Causes, Diagnosis, and Treatment [ I ]       | DL-009   | Listeriosis - A Foodborne Disease [ I ]                   |
| DL-011   | Measles - United States 2014 [ B ]                            | DL-002   | Diagnosis of Malaria in the U.S. [ I ]                        | DL-005   | Q Fever, Diagnosis and Management [ I ]                   |
| DL-008   | Cryptosporidiosis [ B ]                                       | DL-001   | Hantavirus - A Special Pathogen [ I ]                         | DL-003   | Update on Salmonella Foodborne Gastroenteritis [ I ]      |
| DL-007   | Giardiasis [ B ]  | DL-999   | Vitamin D [ I ]   | DL-997   | What's Going on with Whooping Cough? (Pertussis) [ I ]    |
| DL-006   | Rare Antibody: Hemolytic Disease of the Fetus & Newborn [ I ] | DL-996   | Norovirus: Traveler's Diarrhea & Much More [ I ]              | DL-994   | Campylobacter jejuni - Foodborne Gastroenteritis [ I ]    |
| DL-998   | Neonatal Alloimmune Thrombocytopenia [ I ]                    | DL-993   | Coccidioidomycosis (Valley Fever) [ I ]                       | DL-990   | Clostridium difficile 027 [ I ]                           |
| DL-995   | Hemolytic Disease of the Newborn [ B ]                        | DL-988   | The Great Imposter - Lyme Disease [ I ]                       | DL-984   | Cost Effective Clinical Microbiology [ I ]                |
| DL-992   | Organ Specific Autoimmune Diseases [ I ]                      | DL-986   | Candida & its Role in Opportunistic Mycoses [ I ]             | DL-980   | E. coli O157:H7 Infection [ I ]                           |
| DL-989   | Neutrophilia - available on CAMLT website only [ B ]          | DL-982   | Chlamydiae & Their Role in Human Disease [ I ]                | DL-978   | Overview of the Immune System, Part One [ B ]             |
| DL-987   | An Update on Autoimmune Diseases [ B ]                        | DL-979   | Papillomaviruses & Cervical Cancer [ I ]                      | DL-974   | Anaerobic Bacteriology for the Clinical Laboratory [ I ]  |
| DL-985   | Hematology Case Studies/Platelets - on website only [ B ]     | DL-967   | Thyroid Hormones and Thyroid Diseases [ I ]                   | DL-968   | Intro to HIV, HIV Infection & AIDS - 2014 [ B ]           |
| DL-983   | Prion Diseases [ I ]  | DL-966   | Cystic Fibrosis and Microbial Infections [ I ]                |  |   |
| DL-976   | Update on West Nile Virus [ I ]                               | DL-957   | A Bacterial Carcinogen - Helicobacter pylori [ I ]            |  |   |
| DL-975   | Megaloblastic Anemia [ I ]                                    | DL-956   | Patly Pancreas [ I ]  |  |   |
| DL-973   | Hb A1c Testing of Patients with Hemoglobinopathies [ I ]      | DL-950   | Snailbox [ B ]  |  |   |
| DL-965   | Infectious Disease: A Gender Bias [ B ]                       | DL-906   | Ergonomics - Intermediate Self-Study Package for Safety [ I ] |  |   |
| DL-963   | Patient Identification [ B ]                                  | DL-905   | The Bug Everyone Has/ Epstein-Barr Virus Case Study [ B ]     |  |   |
| DL-958   | A Plaque on U.S. [ B ]  |  |   |  |   |
| DL-954   | Updated Review of Blood Collection Equipment [ B ]            |  |   |  |   |
| DL-922   | Hematology Case Study/Hypochromic, Microcytic Anemia [ B ]    |  |   |  |   |
| DL-909   | A Safety Plan for Laboratories [ B ]                          |  |   |  |   |

**DISTANCE LEARNING ORDER FORM - MEMBERS: \$12 PER CE UNIT | NON-MEMBERS: \$15 PER CE UNIT**

SUBMIT DISTANCE LEARNING ORDER FORM, WITH PAYMENT, TO: CAMLT | 39656 MISSION BLVD. | FREMONT, CA 94539

Name: (Please print) \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Day phone: \_\_\_\_\_

Preferred email address: \_\_\_\_\_ CA DPH License/Certificate #: \_\_\_\_\_

Method of Payment: [ ] Check [ ] VISA [ ] MasterCard

Card #: \_\_\_\_\_ Expiration Date: \_\_\_\_\_ 3-digit Security Code: \_\_\_\_\_

Signature (Required of all Registrants): \_\_\_\_\_

# DISTANCE LEARNING

(Home Study)

## Course Registration Form

&

## Answer Sheet

INSTRUCTIONS: Upon completion of one or more Distance Learning courses, answer the test questions using the answer sheet below. Copies of answer sheets are acceptable. Submit the following to CAMLT:

1. Signed Registration Form/Answer Sheet
2. Evaluation Form, and
3. Fee (member: \$12/CE unit  
non-member: \$15/CE unit)

MAIL TO: CAMLT  
39656 Mission Blvd.  
Fremont, CA 94539-3000

Please Print Clearly

Name: \_\_\_\_\_

Home Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_ Zip: \_\_\_\_\_

Home Tel: (\_\_\_\_) \_\_\_\_\_ -- \_\_\_\_\_ X \_\_\_\_\_

Work Tel: (\_\_\_\_) \_\_\_\_\_ -- \_\_\_\_\_ X \_\_\_\_\_

Employed at: \_\_\_\_\_

CDPH License/Certificate # \_\_\_\_\_

METHOD OF PAYMENT:

( ) Member ( ) Non-member

( ) Check Payable to: CAMLT  
(Returned checks subject to a \$20 fee)

( ) VISA or ( ) MasterCard (indicate card type)

Card #: \_\_\_\_\_ Exp. Date: \_\_\_\_\_

3 digit security code on back of card: \_\_\_\_\_

Signature: \_\_\_\_\_

Course Title: \_\_\_\_\_

Course Number: \_\_\_\_\_ - \_\_\_\_\_

SIGNATURE (REQUIRED FOR PROCESSING)

circle the one best answer

|      |      |       |       |       |
|------|------|-------|-------|-------|
| 1. a | 7. a | 13. a | 19. a | 25. a |
| b    | b    | b     | b     | b     |
| c    | c    | c     | c     | c     |
| d    | d    | d     | d     | d     |

|      |      |       |       |       |
|------|------|-------|-------|-------|
| 2. a | 8. a | 14. a | 20. a | 26. a |
| b    | b    | b     | b     | b     |
| c    | c    | c     | c     | c     |
| d    | d    | d     | d     | d     |

|      |      |       |       |       |
|------|------|-------|-------|-------|
| 3. a | 9. a | 15. a | 21. a | 27. a |
| b    | b    | b     | b     | b     |
| c    | c    | c     | c     | c     |
| d    | d    | d     | d     | d     |

|      |       |       |       |       |
|------|-------|-------|-------|-------|
| 4. a | 10. a | 16. a | 22. a | 28. a |
| b    | b     | b     | b     | b     |
| c    | c     | c     | c     | c     |
| d    | d     | d     | d     | d     |

|      |       |       |       |       |
|------|-------|-------|-------|-------|
| 5. a | 11. a | 17. a | 23. a | 29. a |
| b    | b     | b     | b     | b     |
| c    | c     | c     | c     | c     |
| d    | d     | d     | d     | d     |

|      |       |       |       |       |
|------|-------|-------|-------|-------|
| 6. a | 12. a | 18. a | 24. a | 30. a |
| b    | b     | b     | b     | b     |
| c    | c     | c     | c     | c     |
| d    | d     | d     | d     | d     |

## Distance Learning Evaluation Form

This evaluation form MUST BE RETURNED TO CAMLT along with your review questions. Your comments help us to provide you with better continuing education materials in the home study format. We welcome and encourage any additional comments. Please respond to the following statements by circling the number that agrees with your assessment of the statement with "5" meaning you strongly agree, "4" meaning you agree, "3" meaning you have no opinion, "2" meaning you disagree and "1" meaning you strongly disagree.

1. Overall, I was satisfied with the quality of this course.

5 4 3 2 1

2. The objectives of this course were met.

5 4 3 2 1

3. Difficulty was consistent with the no. of CE hours.

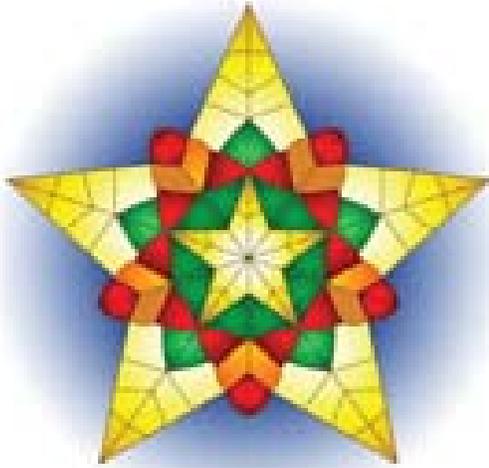
5 4 3 2 1

4. I will use what I learned from this course.

5 4 3 2 1

5. It took me \_\_\_\_\_ hours to complete this course.

6. What did you like or dislike about this program?



## CAMLT's Got a Little List, We've Got a Little List...

**WHEN YOU WISH UPON A STAR**, as they say, dreams can come true. But what if the Star has the wishes? We know you think CAMLT is a stellar organization for laboratory folks. Maybe you feel you have benefited personally from CAMLT's programs – met some great people, attended seminars that helped you grow in your profession, learned about the legislative process and how each of us can become involved. Maybe you would like to return the favor by helping to fund one of CAMLT's excellent programs. Or maybe you would like to fill an immediate, concrete need for the organization. Well, we have just the thing for you...our CAMLT Wish List!

### Wish List Donors

We extend our sincere thanks to the individuals who have contributed to CAMLT's Wish List from Dec 1, 2015 to Nov 30, 2016.

**Abbie Beran  
Jane Bruner  
Corinne Carroll  
Ilene Dickman**

**Dora Goto  
Rose Leigh Vines  
Karen Machida**

**Rich Peterson  
Carol Reese  
Frank Ritenour**

If you are feeling generous, please contact the CAMLT Executive Office at [office@camlt.org](mailto:office@camlt.org) or complete the information below and fax to (510) 792-3045 or return to:

|   |   |
|---|---|
| <p><b>CAMLT</b><br/>39656 Mission Blvd.<br/>Fremont, CA 94539</p> <p>Name: _____<br/>Address: _____<br/>_____<br/>City/State/Zip: _____<br/>Phone: _____<br/>Email: _____</p> | <p>\$ _____ toward technology/website updates<br/>\$ _____ cash donation</p> <p><input type="checkbox"/> My check is enclosed, payable to CAMLT.<br/><input type="checkbox"/> You may charge my donation to my credit card.<br/>    <input type="checkbox"/> Visa<br/>    <input type="checkbox"/> Master Card</p> <p>Card # _____<br/>Exp. _____</p> <p><i>Three-digit security code (on back of credit card):</i> _____</p> <p>Signature _____<br/>Date _____</p> |
|---|---|

For those of you who have given in the past, thank you. Your kindness is appreciated and valued by all!

Please Note - "Contributions or gifts to California Association for Medical Laboratory Technology are NOT tax deductible as charitable contributions for income tax purposes. However, they may be tax deductible as ordinary and necessary business expenses subject to restrictions imposed as a result of association lobbying activities. CAMLT estimates that the non-deductible portion of your contributions - the portion which is allocable to lobbying - is 33%."



# California Association for Medical Laboratory Technology Membership Application

### Personal Information:

Name \_\_\_\_\_

Check one: ( ) Ms. | ( ) Mrs. | ( ) Mr. | ( ) Dr.

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_ Zip \_\_\_\_\_

LFS License/Certificate # \_\_\_\_\_

Day Phone \_\_\_\_\_

### Preferred Email address:

Check here to opt out of email list

### Employment Information:

Employer \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_ Zip \_\_\_\_\_

Work Phone \_\_\_\_\_

CAMLT asks you to contribute to one or both of these worthwhile entities:

#### LAB-PAC

The CAMLT Political Action Committee helps your association advocate on behalf of you and your profession. Help support quality clinical laboratory medicine in the California legislative arena.

*LAB-PAC contributions are NOT tax deductible.*

*You must be a U.S. citizen to donate.*

#### Education and Research Foundation

Your tax deductible contribution supports scholarship programs, outreach efforts and students pursuing careers in the clinical laboratory sciences.

Separate checks should be enclosed for each of these worthy causes.

Applicants are considered for membership in the category which meets their maximum qualifications.

I declare that in making application for membership, I have met the qualifications listed for the category to which I am applying.

Applicant Signature \_\_\_\_\_

Recruiter (if known) \_\_\_\_\_

#### CAMLT's new address as of July 10, 2015:

39656 Mission Blvd., Fremont, CA 94539

Scan/email to: office@camlt.org

Fax to: 510-792-3045 Voice Phone: 510-792-4441

### Membership Categories:

Active - \$120 annually

An individual who 1) Holds a license or certification in a clinical laboratory profession issued by the California Department of Public Health or 2) Holds a baccalaureate degree from an accredited college or university and is eligible to sit for a CDPH approved examination; or 3) Holds a Masters or Doctorate degree in science, education or administration and is actively employed in clinical laboratory science.

Collaborative - \$65 annually

An optional special non-voting, non-office holding membership category open to licensed Medical Laboratory Technicians or Certified Phlebotomy Technicians, who desire to support the association. All other membership benefits are afforded. These members are also eligible to apply for active membership if they desire to vote and/or hold office in the association.

Associate - \$75 annually

An individual who has an interest in the field of clinical laboratory science and/or supporting the purposes or goals of CAMLT, but is not otherwise eligible for membership.

Student - \$10 annually

An individual who possesses a valid training license from Laboratory Field Services or who is enrolled in an LFS approved program leading to licensing as a CLS, or MLT or certification as a CPT. Students at accredited universities or colleges that lead to eligibility for licensure or certification from LFS are also eligible to join as student members.

Lifetime - \$1250 one time fee

Meets Active member requirements and submits the one time application fee.

20/20 Option - Additional \$20 annually

An additional \$20 payment at the time of application or renewal entitles the member a 20% discount on CAMLT state sponsored C.E. fees for the year (not applicable to Distance Learning).

Membership Dues \_\_\_\_\_

20/20 Option \_\_\_\_\_

**Total payable to CAMLT** \_\_\_\_\_

LAB-PAC Contribution (separate check) \_\_\_\_\_

E & R Foundation Donation (separate check) \_\_\_\_\_

**AUTOMATIC RENEWAL AVAILABLE!** You now have a convenient new option to pay your CAMLT membership dues!

Automatic renewal: Credit card listed will be charged on the renewal date each year for the same member category. Notice of renewal will be sent fifteen (15) days before the charge is entered to allow for changes in member category or updates to credit card information.

Sign here to enroll for the automatic renewal option: \_\_\_\_\_ Date: \_\_\_\_\_

Checks to: CAMLT, LAB-PAC and/or E & R as appropriate - OR -

Credit Card Payment:  Visa  Master Card

Card# \_\_\_\_\_ Exp. \_\_\_\_\_

Three-digit security code (on back of credit card): \_\_\_\_\_

Date \_\_\_\_\_ Signature \_\_\_\_\_

# 2017 CONTINUING EDUCATION CALENDAR

Program planning in progress  
Watch [www.camlt.org/calendar](http://www.camlt.org/calendar) for details

|                 |   |
|-----------------|---|
| February 3-4    | San Luis Obispo to Santa Barbara CAMLT Chapter Seminar<br>San Luis Obispo           |
| March 4         | Eastland and Foothill Chapters' Spring Symposium<br>City of Hope                    |
| March 4-5       | Tulare/Kings Chapter Seminar<br>Visalia   |
| March 11-12     | Fresno Chapter Seminar<br>Fresno  |
| March 18-19     | Spring Seminar South<br>Kaiser Regional Laboratory, North Hollywood                 |
| April 22-23     | Spring Seminar North<br>UC Davis Medical Center, Sacramento                         |
| September 15-17 | CAMLT's 78 <sup>th</sup> Annual Meeting, Exhibits & Workshops<br>Hilton Santa Clara |

## CAMLT - A Smart Partnership



## 78th Annual Meetings and Exhibits

September 15 - 17, 2017  
Santa Clara Hilton

WANT MORE INFORMATION? CONTACT:

TEL: 510/792-4441

FAX: 510/792-3045

WEBSITE: [WWW.CAMLT.ORG](http://WWW.CAMLT.ORG)

CAMLT EXECUTIVE OFFICE  
39656 Mission Blvd.  
FREMONT, CA 94539-3000