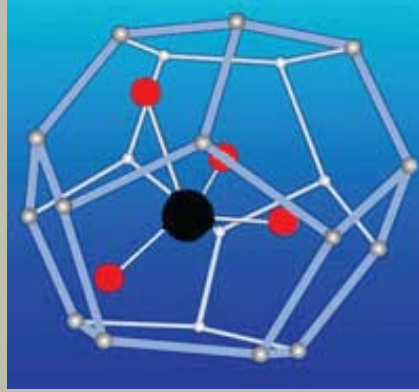


# Mystery Molecule

This molecule is the cause of both the explosion of the Deepwater Horizon oil rig in the Gulf of Mexico and the failure of BP's initial "top hat" solution to the subsequent oil leak. Can you guess what it is?



Answer: Methane hydrate  
This is called a "clathrate" because the gas molecule (methane) is encased in a cage of water molecules. The gulf area is known to contain large quantities of methane hydrate deposits, which are markedly compressed in the ocean bed. Rapid expansion of this gas probably destroyed the oil rig, and methane ice formation probably caused the initial capture device to clog shut. Ironically, if this form of methane could be harvested, it could be a major new source of energy.

## TROPONIN ASSAYS: NOT ALL TROPONINS ARE EQUAL

Leo Serrano, FACHE  
Director, Avera McKennan Regional Laboratory

Cardiac troponin I (TnI) and troponin T (TnT) measurements are used in the diagnosis of acute myocardial infarctions (AMI) as well as other cardiac events. Together with troponin C (TnC), they comprise the ternary troponin TIC complex that is found in myocytes within the myocardium. Detection of an increase in TnI or TnT concentration, combined with evidence of myocardial ischemia, is used in the diagnosis of an AMI.

TnI is a small molecule, 21-24 kDa, while TnT is slightly larger at 37 kDa. It is the variability in size of the TnI molecule that leads to some of the variation in specificity of the various tests. Additionally, the identification of a binary TnIC complex, 40 kDa, has been shown to occur. Morjana et.al.<sup>1</sup>, found that the majority of TnI detected in an AMI patient sera was truncated at the N and C terminals as a result of proteolytic processes in the myocardium. Others have found that the intact form of TnI was the predominant form. It has been suggested that clinical assays for TnI use antibodies directed at epitopes in the central portion of the TnI molecule, which is least susceptible to proteolysis. This, at least in theory, would allow the assay to detect all forms of TnI present in circulation.

Other studies, including a recent article published in *Clinical Chemistry* by Bates, et.al.<sup>2</sup>, have shown that often TnI is present as a binary TnIC complex after an AMI while TnT is nearly always present in its intact-free form. This also explains some of the variability in TnI assays from different manufacturers. Additionally, this paper postulates that the fact that TnIC is sometimes absent in some

patients' sera and present in others. This fact adds to the variability of TnI.

After an AMI, Bates found that circulating TnT appeared to be predominantly in the free, intact form. The Roche TnT assay uses a capture antibody that targets amino acids 136 to 147 and a detection antibody that targets amino acids 125 to 131. The TnI methods vary by manufacturer and do not have the luxury of a proprietary antibody. The Siemens Centaur Advia TnI assay uses three TnI antibodies to capture antibodies recognizing amino acids 41 to 49 and 87 to 91, as well as a detection antibody recognizing amino acids 27 to 40. The Beckman TnI assay (Access two) uses 2 TnI antibodies – amino acids 24 to 40 and 41 to 49. These facts all help to explain the differing results from different TnI assays and also explain the cause for discrepant results.

The issues with the Beckman TnI assays and with the Siemens TnI assays on the dimension and stratus platforms may be due in large part to the above noted data. The most important takeaway from this is that it is incumbent on the laboratory professional as well as to the laboratory medical director to understand the specifics of the assay run in the laboratory and to be able to identify and resolve unexpected aberrant Tn values.

### References:

1. Morjana, NA. "Degradation of Human Cardiac Troponin I After Myocardial Infarction," *Biotechnol Appl Biochem* 1998;28:105-111.
2. Bates, K.J., et.al. "Circulating Immunoreactive Cardiac Troponin Forms Determined by Gel Filtration Chromatography After Acute Myocardial Infarction," *Clinical Chemistry* 56:6 (2010)

Avera St. Luke's Hospital, Aberdeen  
Avera Queen of Peace Health Services, Mitchell  
Avera McKennan Regional Lab, Sioux Falls  
Avera Sacred Heart Hospital, Yankton  
3900 W Avera Drive  
Sioux Falls, SD 57108

# REGIONAL SERVICE CENTER SPOTLIGHT

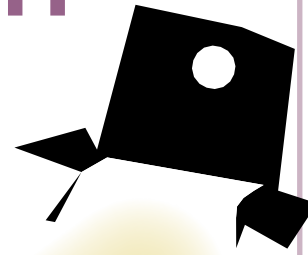
Each quarter, one of our regional service centers is featured in a "Regional Spotlight." In this issue, we share information on the Avera St. Luke's Laboratory.

Have you heard about Avera St. Luke's Laboratory's connection with Haiti? Avera embodies its mission in advocacy for the third-world poor by fundraising and working visits to the Haitian Health Foundation (HHF) in Jérémie, located on the western side of Haiti. Avera St. Luke's Laboratory is privileged to be a "behind the scenes" participant in this part of the Avera mission. Physicians and nurses in Haiti perform pap smears and surgical biopsies and send the specimen slides back to Avera St. Luke's Laboratory. Visitors to HHF send the specimens in the mail once stateside. Avera St. Luke's Laboratory then processes the specimens at no cost.

In 2009, 491 pap smears and 24 biopsies were tested for patients in Haiti. This is a very essential service that otherwise would be unavailable to the people in Haiti.

## Avera St. Luke's Participates in Project SEARCH

Avera St. Luke's is proud to be a host business for the Project SEARCH High School Transition Program. Project SEARCH is a unique one-year school-to-work program that takes place entirely at the workplace. The goal for each student is to have a competitive edge when searching for employment. The program provides real-life work experience combined with training in employability and independent living skills to help youth with significant disabilities make successful transitions from school to productive adult lives. Total workplace immersion creates a seamless combination of classroom instruction, career exploration and on-the-job training with support through worksite rotations or internships. Avera St. Luke's will be hosting seven students this fall. The Laboratory is participating as one of the first workplace rotations for this project.



## Avera St. Luke's Laboratory

# CENTER STAGE



Left to right: Roger Bortnem, Larry Johnston, Terry Reddy, Frank Bain, Ralph Peterson and Bob Luce

- Larry Johnston leads the Avera St. Luke's Laboratory Network Carrier Crew based out of Aberdeen, S.D., the hub city. They travel an average of more than 800 miles a day in north-central South Dakota and parts of North Dakota. They cover Avera St. Luke's client territory east to Sisseton, south to Redfield, west to Mobridge and north to Ellendale and Oakes, N.D. The crew members deliver and pick up hospital and laboratory supplies from more than 30 facilities daily and are known to drive in some inclement and windy weather. Because of the clients crew members serve, they enjoy what they do.
- Congratulations to Avera St. Benedict's Hospital Laboratory for a deficiency-free Clinical Laboratory Improvement Amendments inspection!

- Avera McKennan Regional Laboratory is set to go live with an online test catalog on Sept. 1, 2010! For more information visit the Avera Laboratory Network website at [www.Avera.org/Avera/LaboratoryNetwork](http://www.Avera.org/Avera/LaboratoryNetwork).
- Recently, new board members for the American Society for Clinical Laboratory Science – SD were selected. Members from Avera facilities are as follows:

### Board of Directors:

President – Elect	Lezlee Koch
Past President	Susan Lopez
Secretary	Shirley Heber
Treasurer	Shirley Heber
Board Member at Large	Michelle Friesen
Nominations	Lori Murray

### Standing Committee Chairs (Appointed) or Key Contacts:

Government Affairs 2 Chair	Tanya Crockett
Political Action (PAC)	Janice Maag

### Scientific Assembly:

UA SA	Deniz Blankenfeld
Microbiology SA	Patricia Mitchell
Laboratory Administrator SA	Warren Erickson
Immunohematology	Rebecca Aman
Hemat/Hemostasis	Tracy Busche
Industry SA	Patrick Bezenek
Patient Safety SA	Rhani Resuello

## SAVE THE DATE!

ASCLS-SD & CLMA Siouxland

2010 Fall Collaborative Conference

Crossroads Hotel & Convention Center

Huron, S.D.

November 8 – 9, 2010

Visit [www.ASCLS-SD.org/id4.html](http://www.ASCLS-SD.org/id4.html) for additional information.

## COLORECTAL CANCER SCREENING

As we have heard through the media, hotlines, clinical staff and public health announcements, it is important to screen for colorectal cancer. Colorectal cancer is a disease that affects the cells in the colon or rectum. The cells become abnormal and divide without control, forming a mass or tumor. Colorectal cancer is the second-leading cause of cancer death in the United States. In the laboratory we screen for colorectal cancer using the fecal-occult-blood test (FOBT).

FOBT checks for hidden blood in fecal stools. There are two screening types available. One type, called guaiac FOBT, uses the chemical guaiac to detect heme in the stool. Heme is the iron-containing component of the blood protein hemoglobin. The other type of FOBT, called

immunochemical FOBT, uses antibodies to detect human hemoglobin protein in stool. This type can be tested with submission of only one stool sample and without following a special diet. The guaiac FOBT requires a special diet (no red meat for three days and limited intake of vitamins and vegetables) and stool samples from three consecutive days.

Additional information will be distributed in an educational flier.

### Sources:

<http://www.cancer.gov/cancertopics/factsheet/Detection/colorectal-screening>  
[http://clearview-fobt.com/pat\\_why\\_fob.asp#](http://clearview-fobt.com/pat_why_fob.asp#)  
<http://doh.sd.gov/ColorectalCancer/CRC-SiteManual.pdf>