Lyme Disease Protein Structure Determined at BNL

A research team working at BNL has determined the three-dimensional structure of a key protein on the bacterium that causes Lyme disease. Called OspC, the protein is derived from two strains of the Lyme disease bacterium. This research may lead to a second-generation vaccine that would be more effective than the vaccine currently used.

The current vaccine is based on another Lyme disease protein, known as OspA, which was previously deciphered at Brookhaven. Both OspA and OspC are outer surface proteins of Borrelia burgdorferi, the bacterium that causes Lyme disease. Researchers from BNL, Stony Brook University’s School of Medicine, the University of Rochester Medical Center and Rutgers University reported their findings on the structure of OspC in the March 1, 2001, edition of The EMBO Journal.

Spread by the bite of an infected deer tick, Lyme disease is the most common vector-borne disease in the U.S. Between 1982 and 1996, over 99,000 cases were reported in the nation. Early symptoms of the disease may include a bull’s-eye rash and flu-like symptoms. The disease is not promptly treated with antibiotics, more serious symptoms, including joint and neurological complications, may develop.

To determine the structure of OspC, the team used a technique at the National Synchrotron Light Source (NSLS) known as multiple wavelength anomalous diffraction. First, researchers grew crystals of the protein and chilled with a beam of intense x-rays at the NSLS. To make large quantities of OspC, the team used the T7 gene-expression system, which was developed at Brookhaven.

Then OspC crystal was illuminated with beams of x-rays at different energies and diffraction patterns were recorded on a detector. With the aid of powerful computers, the researchers then analyzed the diffraction patterns to gain the vital information needed to create an image of the protein structure.

John Dunn, a member of the research collaboration from BNL’s Biology Department, explains that the structure of OspC is predominantly helical, and very different from OspA, which is flat. Also, a region on the surface of OspC has a strong negative charge. Dunn says the negatively charged region may be attracted to a positively charged site on the surface of human cells, helping the bacterium to cause infection. This feature is only found in the OspC protein derived from bacterial strains that cause human disease.

The scientists believe that a vaccine based on OspC will be more effective than the current OspA-based vaccine because the OspC protein is only present in the bacteria while they are in the cold-blooded deer tick’s stomach, but not in the host. After the tick bites the warm-blooded mammalian host, the infected bacteria produce OspC in the host’s bloodstream.

When the host is vaccinated solely with OspA, antibodies to this protein can only kill the bacterium inside the tick if it ingests these antibodies with its blood-meal. If the bacterium finds its way into the host, it changes into several other forms for which the vaccine offers no protection.

In contrast, an OspC-based vaccine would enable the host to make antibodies to kill the Lyme disease bacteria within the host’s body.

Another member of the Brookhaven team, Subramanyam Swaminathan, Biology Department, adds, “To develop an effective OspC-based vaccine, we have to know the three-dimensional structures of at least a few variants of OspC, especially those from invasive strains. Since we’ve solved the structure of OspC based on two infectious strains of the Lyme disease bacterium, we now have a prototype for determining the structure of OspC from other strains.”

— Diane Greenberg
**DOE Ombudsman to Visit Next Week**

Next Wednesday through Friday, March 7-9, the DOE National Ombudsman, Jeremy Wu, will visit Brookhaven. Wu was appointed last year by Secretary Richardson as a result of a recommendation from the task force on racial profiling. The Office of the Ombudsman is under the Office of Economic Impact and Diversity, which provides an opportunity for employees to confer with a designee to discuss concerns, recommendations, and complaints perceived to interfere with productivity or morale.

The mission of the Office of the National Ombudsman is to be a catalyst in building trust and producing positive change to advance a diverse, equitable, and productive work environment. The general goals of the Ombudsman are to promote understanding, resolve concerns, identify systemic issues, and produce positive change. He provides Ombudsman’s services to DOE employees and contractor employees.

In an effort to carry out his mission, Wu requested to meet non-management staff to allow for open and frank exchange. This meeting is scheduled on March 7 in Berkner Hall Auditorium from noon to 1 p.m. Employees who would like to speak with Wu confidentially while he is here, can make an appointment by calling his secretary, Regina Neal, (202)586-2234, or regina.neal@hq.doe.gov.

For additional information on the Office of the Ombudsman, go to www.hq.doe.gov/ombuds/.

**Summer Camp Expo**

On Wednesday, March 14, from 11 a.m. to 2 p.m., in Berkner Hall several Long Island summer camps will be providing facilities and registration information to BNlers. For more information, contact Sue Foster, Ext. 2888, or foster2@bnl.gov.

**Calendar of Laboratory Events**

- The RESEA Sales Office is located in Berkner Hall and is open weekdays from 8 a.m. to 4 p.m. For more information, RESEA, contact Anusha Edler, Ext. 1334, or M. Kay Dhollander, Ext. 2873.
- Additional information for hospitality concerns can be found at the Lab الحوثية and the laundry in the apartment areas.
- The academic building is located in the apartment area.
- Calendar events flagged with an asterisk (*) have an accompanying story in this week’s Bulletin.

**Next Week**

- **Tuesday, 3/6**

- **Wednesday, 3/7**
  - Ombudsman Meeting at BNIL, noon to 1 p.m., Berkner Hall.
  - The DOE National Ombudsman, Jeremy Wu, will meet with non-management staff for an open discussion on concerns, recommendations, and complaints perceived to interfere with productivity and/or morale. Wu will be at the Lab until Friday, 3/9.

- **Thursday, 3/8**
  - Sam’s Club Info: 11 a.m. to 2 p.m., Berkner Hall. A representative will be at the Lab to provide information on how to apply to BNIS. BNLers who would like to become members of Sam’s Club.

- **Friday, 3/9**
  - GLOBE Meeting: For more information and for the time and location of the gay and lesbian club’s meeting, contact Mike Lullo, Ext. 2900, or Chris Gardner, Ext. 4537.
STAR Detector Upgrade Allows Scientists to Look Closer at RHIC Collisions

On Saturday, February 17, a silicon vertex tracker (SVT) was installed into the STAR detector at RHIC. This upgrade — which was the culmination of eight years of research, development, and design by a team of more than 50 people — will allow physicists to collect data at a much closer proximity to the point of collision than was possible before the upgrade.

Compared to the time projection chamber (TPC) portion of the detector, which is located approximately 50 centimeters from the interaction region, the three silicon layers of the SVT reside, respectively, at 5, 10, and 15 centimeters from where the gold-gold collisions are occurring. This close proximity allows for the detection of charged particles that usually delay before reaching the TPC.

According to SVT project leader Rene Bellwied, Wayne State University, “The installation of the SVT will allow for the detection of particles with short lifetimes, such as cascade and omega particles.”

Silicon drift detection — a new semiconductor technology that was developed in the mid-1980s by BNL physicist Pavel Rehak — was employed in the design of the SVT for a thirty-fold increase in resolution compared to the TPC.

Bellwied also adds, “A portion of the ‘dark hole’ in the center of previous STAR images will be filled with some wonderful tracks in future STAR images.”

Calendar

— WEEK OF 3/12 —

*Hospitality Potluck Party
5:30 p.m., Racqueton Bluff. All are welcome, especially newcomers to the Lab. Bring your family, friends, and your favorite dish to share. For more information, contact Mimi Lucio, 821-1435, or Louise Woltering, 744-7964.

Tuesday, 3/13

*Income Tax Workshop
noon-1:30 p.m., Recreation Bluff.

Wednesday, 3/14

*Summer Camp Expo
11 a.m. - 2 p.m., Berkner Hall. Long Island summer camps will be providing facility and registration information to BNLers. For more information, contact Sue Foster, Ext. 2688, or foster2@bnl.gov.

Thursday, 3/15

*Income Tax Workshop
noon-1:30 p.m., Recreation Bluff.

Science, Politics, & Budgets Talk
The talk will be presented by Peter Bond, Director’s Office, and will focus on how the Washington D.C. budget process works and how scientists’ role in the political process can be either constructive or destructive.

BERA Bridge Club
7 p.m., Berkner Hall cafeteria
For more information, contact Mona Stockmen, Ext. 4192, mms@bnl.gov.

— WEEL OF 3/19 —

Wednesday, 3/21

BERA Ski Trip
Round trip to Big M, Massachusetts includes bus transportation and lift ticket. Bus leaves Brookhaven Center at 5 a.m.

Brookhaven Lecture
4 p.m., Berkner Hall
Jose Rodriguez will speak on “Environmental Catalysis: SO2 Surface Chemistry on Oxides and Metals.”

Thursday, 3/22

Apheresis Blood Drive
Brookhaven Center. BNL volunteers from the previous apheresis drive are scheduled to donate platelets. For more information, contact Sue Foster, Ext. 2688, or foster2@bnl.gov.

Friday, 3/23

Women Engineer’s Lunch Networking Meeting
Noon, Berkner Hall, Room A
Contact Arlene Zhang, Ext. 3369.

Note: This calendar is updated continuously and will appear in the Bulletin whenever space permits. Submissions must be received by the preceding Friday to appear in the following week's Bulletin. Please include the information for each event in the order listed below: date, event name, time, description, and cost and send it to bulletinкал@bnl.gov. Please state “Calendar” in the subject line.

BERA Spring Fling
The annual BERA Spring Fling will be held on Friday, March 30, at the Rock Hill Country Club in Manorville at 6 p.m. There will be a D.J., a cash bar, and a buffet dinner served from 7 to 9:30 p.m. Tickets cost $15 each and can be purchased by contacting: Andrea Dehler, Ext. 3347; John McCaffrey, Ext. 2075; Louie Nieves, Ext. 7701; or Laurie Pearl, Ext. 5520.

Spirit Dinner Cruise
Join BERA on Tuesday, July 3, for an Independence Day sail around Manhattan on a luxury yacht that will cruise past the Statue of Liberty, Ellis Island, and other fabulous Manhattan landmarks. Tickets include round-trip bus transportation, live music and entertainment, and a buffet dinner. The bus will depart from the Brookhaven center at 4 p.m.

Tickets are being sold first come, first-served for $75 per person at the BERA Sales Office. For more information, contact Andrea Dehler, Ext. 3347; Rosalie Piccione, Ext. 3160; or M. Kay Dillmore, Ext. 2873.

T-100 Consolidated Warehouse Grand Opening
The Lab community joined the Procurement & Property Management Division (PPM) at a ribbon-cutting ceremony on Wednesday, February 14, to celebrate the consolidation of three warehouses into the new T-100 warehouse, which provides a more functional space. According to Mary-Faith Healey, PPM Manager, the consolidation reduced the total number of line items from 13,000 to 5,200 and will save the Laboratory over one million dollars per year. PPM maintains a stock of items, which include everything from paper towels to electronic components — all of which can be ordered on-line at http://130.199.76.90/picktick/.

Calendar (continued)
LABORATORY RECRUITMENT - Opportunities for Laboratory employees.

DD2799. SECRETARIAL POSITION – (part-time) Requires a B.S. degree in secretarial science or equivalent experience. Knowledge of electronic word processing and computer skills is required. Experience working with and answering telephones, ordering supplies, and typing is necessary. Perform clerical support tasks for the Laboratory's Security Office. This position is with the Department of Government, Public Affairs.

DD3888. OFFICE SERVICES POSITION – (part-time) Requires experience in secretarial science or equivalent experience. Knowledge of electronic word processing and computer skills is required. Experience working with and answering telephones, ordering supplies, and typing is necessary. Prepare various correspondence and provide support for the Executive of the Laboratory's Information Systems Division. This position is with the Department of Information Systems, Government, Public Affairs.

DD9086. OPEN RECRUITMENT – Opportunities for Laboratory employees and candidates. Positions are available in the area of computer science and engineering.

DD1953. PHYSICIST – Requires a Ph.D. in physics. Experience in the area of experimental physics or materials science is desirable. Will conduct research in the area of condensed matter physics. Will work with the BNL Accelerator Research Facility. This position is with the Department of Physics.

DD2039. POSTDOCTORAL RESEARCH ASSOCIATE – Requires a Ph.D. in physics. Experience in the area of condensed matter physics or materials science is desirable. Will conduct research in the area of condensed matter physics. This position is with the Department of Physics.

DD2046. TECHNICAL POSITIONS – Requires a B.S. degree in engineering or a related field. Must have experience in the area of electronics or computer science. Will be responsible for the design and development of electronic systems. Will also be responsible for the maintenance and troubleshooting of these systems. This position is with the Department of Electrical Engineering.

<Adverts>

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LIZ SUSBRETT, editor
ROBERT A. BOSCH, managing editor
KAREN A. ADLER, photographer

New Computer Ordering Procedure

Requisitions will continue to use Dell's BNL Pre-Order System. Only standard systems may be configured by using an E-quote. (See www.bnl.gov/ppm for directions). Users will then choose a Dell computer, referencing the Dell E-quote number, the E-quote name, and their e-mail address. The web requisition will follow the normal approval procedures and PPM will place the order electronically with Dell.

Web requisitions submitted without an E-quote cannot be processed. Orders can be tracked using the BNL PO number. Dell will notify the requisitioner's office by Ship- ping and Receiving.

ITD will still be available for technical recommendations and installations through the ITD Help Desk.

Subjects Wanted

If you are between 18 and 50 years old, speak English, and do not use illicit drugs, you may be eligible to participate in a MRI research study. All participants will be compensated for their time. For additional information, contact Megan, Ext 5953, or Trish, Ext. 2773.

Game Room Opens

Poly MPs, card players, Yahtzee, chess, checkers, Trouble, Scrabble, Candyland, and other games are available in the Brookhaven Card Room. Games can be played week- days until 11 p.m., and on Sundays from 9 p.m. to 5 p.m.

Potluck Party

The Hospitality Committee welcomes Lab newcomers and BNLers at its potluck party on Friday, March 9, at 5:30 p.m. in the Recreation Bldg. Bring your family, friends, and your favorite dish to share. For more in- formation, contact Mimi Luccio, 821-1435, or Lane Woltering, 744-7964.

<Adverts>