



May 2009

Dear Science Olympiad Coaches,

### **Congratulations to you and your team for making it to the National Tournament!**

My name is Shannon Colton and I am the National Event Supervisor for the trial event, Protein Modeling. This event was developed by the Milwaukee School of Engineering Center for BioMolecular Modeling ([www.rpc.msoe.edu/cbm](http://www.rpc.msoe.edu/cbm)) in an effort to engage students in exploring the 3-dimensional molecular world.

Protein Modeling will be an official selected trial event for the 2010 competition year, with the intent of being an official event in 2011. **We are offering the Protein Modeling event as a trial event at the 2009 National Tournament. I encourage each team to participate in the event at the National Tournament.** This is an excellent opportunity to explore the molecular world and modeling before it is offered at the 2010 competitions.

#### **What is the Protein Modeling event?**

This is a trial event in which students will learn about protein structure and function. Students will use computer visualization and online resources to guide them in constructing a physical model of a protein. Students will explore a molecular biology topic (for 2009, it is ribonucleases), design a model of this protein in a computer environment and then translate that image into a 3D physical model using Mini-Toobers<sup>®</sup> (foam-covered wire) or a similar modeling material.

#### **How should we prepare to participate in this event at the National Tournament?**

- First, read the Protein Modeling Event rules ([http://soinc.org/sites/default/files/uploaded\\_files/2009ProteinModelingEventRules.pdf](http://soinc.org/sites/default/files/uploaded_files/2009ProteinModelingEventRules.pdf))
  - This event normally has three parts (a prebuild, an onsite build and an exam)
  - For the National Tournament, the event will have two parts – an onsite build and an exam, each worth 50 points.
- Explore protein structure – for additional resources, please visit the CBM website (<http://www.rpc.msoe.edu/cbm/scienceolympiad/biochem.php>)
- Read David Goodsell's Molecule of the Month on ribonuclease ([http://www.pdb.org/pdb/education\\_discussion/molecule\\_of\\_the\\_month/download/RibonucleaseA.pdf](http://www.pdb.org/pdb/education_discussion/molecule_of_the_month/download/RibonucleaseA.pdf)) to learn about the function and structure of ribonucleases.
- Look into additional information about ribonucleases – explore this topic beyond what David Goodsell has put into his article.
- Learn how to use Jmol to design a model and practice designing – for more information about how to use Jmol to design models, please visit the CBM website (<http://www.rpc.msoe.edu/cbm/scienceolympiad/jmol.php>)
- Practice modeling what you have designed through the Jmol interface using modeling materials. We will provide Mini-Toobers<sup>®</sup> at the competition, but you can practice using pipe cleaners, twist ties (such as those found at <http://www.kwiktivist.com/Home.html>) or plant ties that have a wire in them (such as those found at <http://www.shopwiki.com/search/Foam+Plant+Tie>).

### **What we will do at the Protein Modeling event at Nationals?**

Teams of 1-3 students will be challenged to create a model of a portion of the ribonuclease (based on 1RTA.pdb) and to answer questions about the protein structure and function, with specific emphasis on ribonucleases.

### **Prizes to the Winners!**

The winning team will receive prizes from the Milwaukee School of Engineering and will be awarded a \$1000 scholarship if you choose to attend MSOE.

If you have any questions regarding the Protein Modeling event, please contact me.

Thanks and good luck at the Tournament!

Sincerely,

A handwritten signature in purple ink that reads "Shannon Colton".

Shannon Colton, Ph.D.

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