



## Teacher Professional Development Workshop MIT Museum Learning Lab: The Cell

April 29, 2010 Thursday, 4:00 p.m. - 6:00 p.m.



### *Learn Cell Biology the Hands-On Way Using Molecular Manipulatives*

**Experience both the tactile LEGO® and virtual models employed in this sophisticated simulation of protein synthesis!**

#### Who should attend:

- Middle School and High School Science Teachers who would like to refresh their molecular biology.
- Teachers who are exploring the idea of bringing a class to the Learning Lab at the MIT Museum.

#### More about the teacher workshop:

In this two hour workshop, we will learn about two approaches to teaching molecular biology: using physical manipulatives based on LEGO and computer modeling.

In the facilitated LEGO program, we learn about protein structure by building a channel protein. First, we build and fold LEGO amino acid chains. We then utilize a gene, created from LEGO nucleotides, and step through transcribing and translating the DNA using the LEGO models of mRNA and tRNA. Because the room is designed to represent a cell, we move between the appropriate cellular compartments as we perform these molecular processes. We finish by placing our channel protein in the cell membrane. In addition, we observe the effect of a single nucleotide replacement in the shape of the resulting protein and discuss cystic fibrosis as an example of such a replacement.

In the computer modeling, we work with the program Molecular Workbench, created by the Concord Consortium. This software models the major concepts in protein synthesis and both DNA and protein structure. We will also explore the STAR Biochem program developed at MIT – an amazing 3-D visualization tool for exploring protein structure that we used with more advanced groups, such as AP Biology classes.

Note: Three grade level appropriate lessons are offered at the Museum, meeting the Mass State Standards (middle school, high school and AP)

#### How to sign up:

##### **Date and time:**

Thursday April 29<sup>th</sup>, 2010 4:00 PM to 6:00 PM

**Cost:** Free but pre-registration required. Limited to 12 teachers per date. PDPs awarded. Funded by the Arthur Vining Davis Foundations with additional support from the MIT Center for Environmental Health Sciences.

**Call:** Dr. Amanda Gruhl, 617-253-1053 for more information or to register by phone

**Register online:** to register online, see: <http://museum.mit.edu/forms/teacher-workshop>

**Location and photos:** For more information about the location of the MIT museum and details on the Learning Lab see: <http://web.mit.edu/museum>