i-STEAM with CSATS

PennState College of Education

CSATS Bridging Research & Education in STEM Center for Science and the Schools

PennState College of Medicine

i-STEAM The Molecular Mechanism of Diabetes

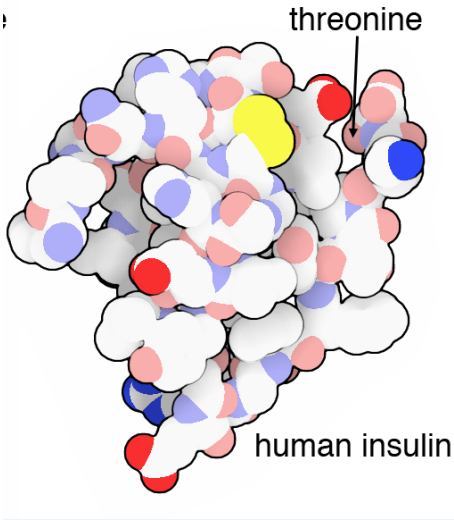


Photo from : https://pdb101.rcsb.org/motm/14

Presented by

Dr. Ira Ropson, Ph.D.
Assistant Dean of Medical Student Research
Amber Cesare (Center for Science and the Schools)
and
Tiffany Lewis (Middletown Area High School)

Saturday, March 30, 2019
9:00 a.m. – 3:30 p.m.

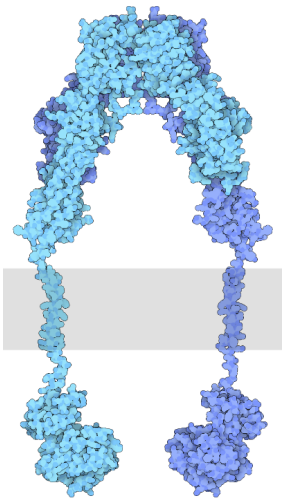
118 Chambers Building
University Park, PA 16802

Proteins are essential machines of the cell! Join us in a phenomenon-based unit to explore the molecular modeling of insulin and related proteins. Teachers in this workshop will learn how to use molecular modeling software (Jmol) and classroom models to explore macromolecular structure and function. This unit can be used to review for the Keystone Biology exam, because it will cover the following topics: transcription, translation, protein folding, post-translational modification, cell transport, cell signaling, metabolic disease, and biological macromolecules.

Target audience: Secondary Life Science Teachers (7-12)

This workshop is **FREE** to all educators with ACT 48 credit available.

All i-STEAM Workshops are aligned to PA State Standards, Next Generation Science Standards and Common Core. A continental breakfast and lunch are provided by the Center for Science and the Schools (CSATS). Maximum enrollment is 24; please register online now to reserve a spot.



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The Penn State College of Education
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182 Chambers Building, University Park, PA 16802

To register visit: http://csats.psu.edu
For more information, email Amber Cesare at ams5306@psu.edu or call 814 867-1323

Grade 10
Math Standards
CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects.
CC.2.3.HS.A.14 Apply geometric concepts to model and solve real world problems.
English Language Arts Standards
CC.3.5.9-10G. Translate quantitative or technical information expressed in words in a text into visual form and translate information expressed visually or mathematically into words.
CC.3.5.9-10J. By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
CC.3.6.9-10.F. Conduct short as well as more sustained research projects to answer a question or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
CC.3.6.9-10.G. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research.
Science Technology and Engineering Standards
BIO.A.2.1.1 Describe how biological macromolecules form from monomers.
BIO.A.2.2.3 Compare the structure and function of carbohydrates, lipids, proteins and nucleic acids in organisms.
BIO.A.2.3.1 Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction.
BIO.A.3.2.2 Describe the role of ATP in biochemical reactions.
BIO.A.4.1.2 Compare the mechanisms that transport materials across the plasma membrane (i.e., passive transport – diffusion, osmosis, facilitated diffusion; and active transport – pumps, endocytosis, exocytosis
BIO.A.4.1.3 Describe how membrane-bound cellular organelles (e.g., endoplasmic reticulum, Golgi apparatus) facilitate the transport of materials within a cell.
BIO.A.4.2.1 Explain how organisms maintain homeostasis (e.g., thermoregulation, water regulation, oxygen regulation).
BIO.B.2.2.2 Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins.
BIO.B.2.3.1 Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frame-shift).
BIO.B.2.4.1 Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy.