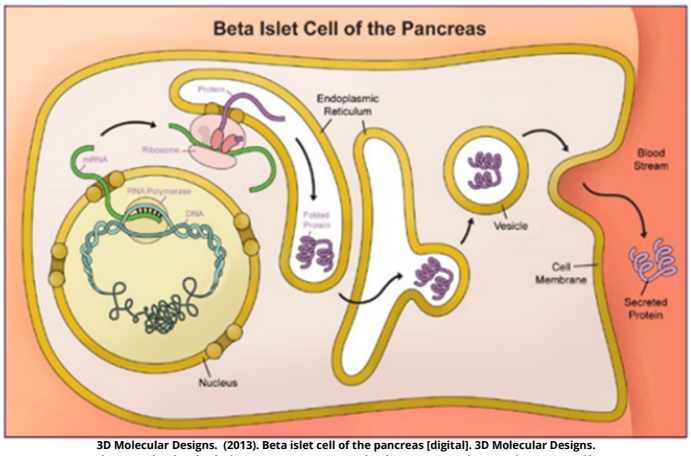
SHAPE MATTERS



3D Molecular Designs. (2013). Beta islet cell of the pancreas [digital]. 3D Molecular Designs. https://3dmoleculardesigns.com/wp-content/uploads/2022/09/StudentHandout3-8-13.pdf

A teacher professional development workshop

Apply now!

June 20 - June 30, 2023 (in-person)
July 10, 2023 (virtually)
9 AM - 4 PM
118 Chambers Building, University Park, PA 16802

SHAPE MATTERS is a 10-day professional development workshop for secondary life science and chemistry teachers. Led by the Center for Science and the Schools (CSATS) and scientists from the Penn State College of Medicine and the Eberly College of Science, teachers will learn how scientists solve protein structures and create visualizations to explore molecular stories related to human health (ex. insulin and diabetes). Using the provided curriculum kits and 3-D printers, teachers will work with the SHAPE MATTERS team to design a molecular modeling research project for their classroom. This project will help students to understand protein structure (one of the four macromolecules), protein synthesis, and the role of proteins in homeostasis. As student teams explore and visualize a protein of choice, they will be prepared to participate in the annual SMART teams event. Funding will also support student teams to visit labs at Penn State.

Participant Benefits:

- A $2,000 stipend for participating during the summer.
- A $1,500 stipend for the implementation of a molecular modeling research project in the classroom.
- Over $2,000 of classroom materials, including lab supplies, molecular modeling kits from 3DMD, and a Prusa 3-D printer for the classroom.
- Lodging and meals included. Mileage reimbursement up to $1,000.
- Must be within driving distance to Penn State University Park as a car is required for transporting classroom supplies home.
- Invitation to bring students to present molecular modeling projects at the SMART teams symposium.
- Act 48 credit is available upon request.

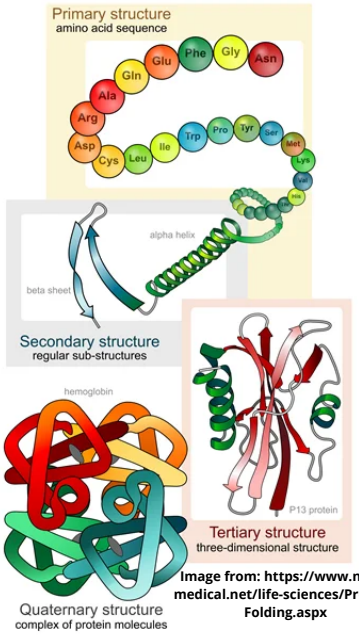


Image from: https://www.news-medical.net/life-sciences/Protein-Folding.aspx

SEPA SCIENCE EDUCATION PARTNERSHIP AWARD
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College of Education Eberly College of Science
College of Medicine

Academic Standards

Next Generation Science Standards:

- **HS-LS1-1** Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
- **HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- **HS-PS1-2** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- **HS-PS2-6** Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

Keystone Eligible Content:

- **BIO.A.2.2.2** Describe how biological macromolecules form from monomers.
- **BIO.A.2.3.2** Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.
- **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).

PA STEELS Standards (Updated PA Science and Technology Standards):

- **3.1.6-8.B** Develop and use a model to describe the function of a cell as a whole and the ways that parts of cells contribute to the function.
- **3.1.9-12.P** Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
- **3.2.6-8.A** Develop models to describe the atomic composition of simple molecules and extended structures.
- **3.2.9-12.B** Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.