EMBL

Protein Art and Science Workshop Toolkit

Age Group: 14-18 year olds or anyone interested in proteins
Group Size: Maximum 25 people
Duration: 120 minutes

About EMBL

EMBL is Europe's life science laboratory. We are an intergovernmental organisation supported by over 25 member states and operating across six sites in Europe. EMBL performs fundamental research in molecular biology, studying the story of life. Our research drives the development of new technology and methods in the life sciences, and we work to transfer this knowledge for the benefit of society.

About EMBL Science Education and Public Engagement

EMBL's Science Education and Public Engagement (SEPE) office leads and coordinates the institute's science education programmes and public engagement efforts.

Formerly known as European Learning Laboratory for the Life Sciences, ELLS, we are building on EMBL's long history of science education and public engagement, and support EMBL's commitment of sharing and discussing our research with young learners, teachers and diverse publics.

Our science education activities share the scientific discoveries of EMBL through inspiring teaching and learning experiences with school science teachers and young people of all backgrounds aged between 10 and 19 years.

Our programmes convey complex, cutting-edge topics in life science research in an exciting and insightful way, fostering the discovery of current research trends, the scientific method, and scientific career paths. Our activities are developed and run in close collaboration with EMBL scientists.

Visit our website for further information about EMBL's science education and public engagement activities: embl.org/sepe

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Introduction

This toolkit was created by the EMBL Science Education and Public Engagement team as an example guide for educators and partners who would like to run workshops exploring protein form and function from an artistic perspective. The workshop is intended to appeal to anyone interested in the interface of art and sciences. It was developed as part of EMBL's most recent outreach initiative "Unfold Your World: Nature's Molecular Wonders", which inspired more than 150 young people from across Europe to create a protein-inspired artwork. This guide provides detailed information regarding the list of materials and the quantities you will need to conduct the workshop.

This workshop works particularly well with high school students. However, it can also be used with a broader public audience with an interest in proteins in the context of life sciences. We invite the prospective workshop facilitators to adapt and rework the narration of the story and choice of words to best bring across the information you would like to share with the audience.

Workshop Outline

Theme:

The workshop is inspired by one of nature's smallest building blocks, proteins. By exploring a protein database, mimicking the 3D structure of proteins and initiating creative artwork design inspired by proteins, we aim to convey the message that "proteins are able to do their job properly because of their unique shape".

Take Home Messages:

- Proteins are natural biological polymers with distinct shapes.
- Proteins perform distinct functions.
- Proteins rely on their correct shapes to function properly.

Workshop Structure

Protein Art and Science workshop is made up of 4 activities. Facilitators can benefit from the available slidedeck (linked here: Copy of EXT_UYW: Workshop Slide deck_ENG) to navigate through the activities. We have also created example room layouts for the workshop in the "UYW Workshop Room Layouts" document here: Copy of EXT_UYW Workshop Room Layouts.

Warm-up Activity
Enables facilitators to get a feeling of how familiar the audience is with the term 'proteins' from a scientific and social perspective and enables participants to potentially connect up what they know and are interested in.

Activity 1 - Introduction to Protein Structure and Function
Focusing on insulin as a 'hero' protein, participants explore its 3D-structure in Protein Data Bank Europe and use pipe cleaners to replicate the structure of insulin and discuss the relationship between form and function.

Activity 2 - Inspiration from Proteins
Participants explore an inspiration sheet focused on insulin, starting a process of artistic inspiration. Other inspiration sheets can be shared, on proteins including cryptochrome and the wasabi receptor protein, TRPA1. Participants can also take inspiration from protein structures in Protein Data Bank Europe and from previous protein artwork by young people.

Activity 3 - Turning Inspiration into Artwork
Participants select visual cues sheets for inspiration, and/or to make a collage, as well as selecting art materials in a 'shoparound'. The objective is to explore ideas and start a process of creating an artwork.

Activity 4 - Sharing Inspiration and Next Steps
Using Post-its or verbal feedback, participants share their ideas and what they plan to do next.

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Feedback for developers
We hope you enjoy the workshop with your participants! We look forward to your and participants' feedback on the "EMBL Protein Art and Science Workshop" that you can share with us at proteinart@embl.org .

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Interested in receiving the full workshop toolkit? Please email sepe@embl.org.