expanding the german curriculum for biology

As a recent field of research, synthetic biology has only been established in german schools since 2015. As a part of our outreach we created a toolbox of resources helping teachers to integrate this topic in their classes. We believe that it is crucial to do so because synthetic biology is -as we all know- a fast growing and influential research area. It can be difficult to keep track of innovations and be able to convey them to the students.

Our first approach included an introduction to the basic methods and goals of synthetic biology. Subsequently the students worked in groups discussing about global problems to develop different approaches for solving them with synthetic biology. Furthermore we wanted to draw attention to ethical aspects and safety requirements. We were positively surprised that the students came up with a lot of well reasoned ideas regarding the discussed topics.

After analyzing the surveys conducted during the first few school lessons it became clear that one aspect in our concept was still missing. The pupils craved to know more about how exactly the design of the labwork within iGEM takes place. They had heard a lot about the principles of synthetic biology and were longing for detailed information. So we decided to design a second lesson covering this specific aspect. How better to explain this than to use our own project and let the pupils themselves refeel the inspiring process of planning it?

Of course, we simplified the process of finding a suitable topic, as it took us several months to fully come up with and plan our topic. We prepared index cards with all the required information at an understandable level. Each of our subteams processed their most important paper sections and graphs along with vocabulary help. Included is the possibility to learn about the implementation of a new pathway in a compartment, the nootkatone and violacein pathways, optogenetics and other exemplary topics. An essential part is the flashcard about the scientific background information: peroxisomes and their import machinery.

We are convinced that this lesson concept provides the pupils with a deep understanding of project planning routines and all the processes needed for a successful iGEM year. They develop the ability to work together as a group and communicate about complex topics. Furthermore they consolidate their knowledge about synthetic biology from the first lesson.

We had the possibility to skype with Kerstin Göprich, who is the founder of “ring-a-scientist.org”, a platform that brings together students and scientists. Skype is a great medium for connecting those groups. The students can witness experiments which could never be performed in their classrooms and get “first-hand information about studying science at a university” *(ring-a-scientist.org)*. Kerstin Göprich, herself a young scientist, believes that it is very important to inspire the next generation of scientists. On the other hand there is always the issue of the lack of time. “Ring-a-scientist.org” solves this problem in a gorgeous way.

Kerstin was very happy when we offered to try her concept and supported us by sending her evaluation questions. We completed our school lectures with skype-calls directly into our lab. Marvin and Jan explained the concepts of plasmid-design with geneious and showed the evaluation of a gel electrophoresis in real time. We experienced enthusiastic students, thankful to see it up close.