Newsletter July

Dear reader,

The month july has passed already, which means only less than three months till the wiki-freeze. Currently, we are working in the wet- & dry-lab and making progress! This week we'll introduce our communications team and show our promotion video and website. Enjoy the newsletter!

Content

Introductions

Design Manager - Jetse van Os

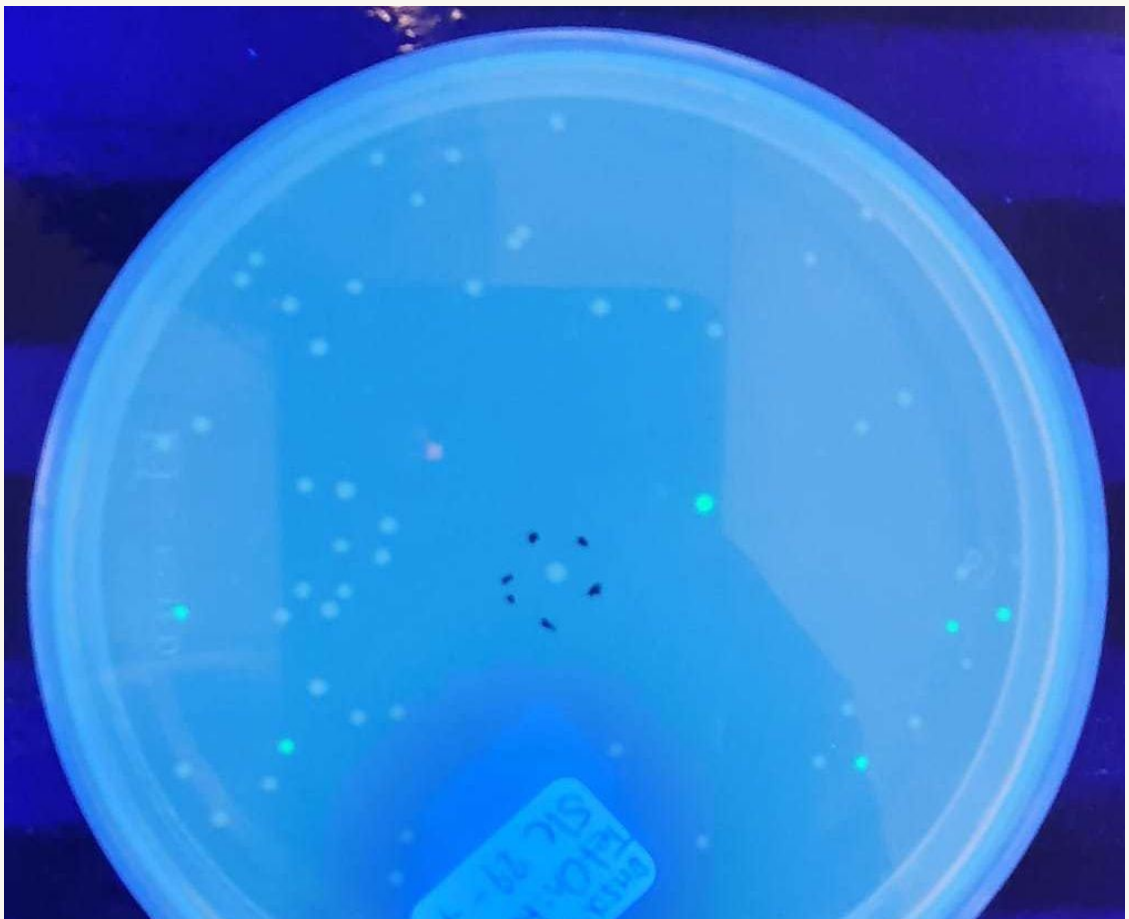
Hi! My name is Jetse. I am 21 years old and just recently finished my bachelor Molecular Science & Technology. Being more of a chemical engineer, one of the reasons I joined the 2021 Leiden iGEM team is to explore the biology side of my discipline further. Experiments like PCR, gel electrophoresis and plasmid isolation are all new to me, but luckily I am rapidly adapting to this exotic environment! In this year's team I fulfill the role of design manager, which means I am responsible for dressing our project in the appropriate outfit. By transforming the core of our project into an appealing image, it feels like I am building the bridge between us

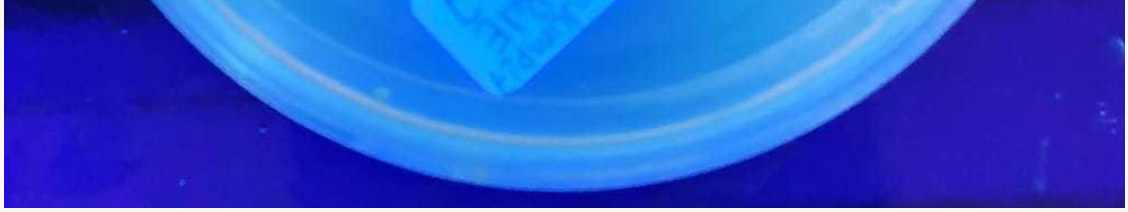
and our audience. I look forward to showing our work to rest of iGEM at the (virtual) Giant Jamboree!

Communications Manager - Sebastiaan Ketelaar
Hello everyone! I'm Sebastiaan. I'm 24 years old, in the first year of my master Molecular Genetics and Biotechnology.
I am in charge of communications for our team. This includes contact with other parties, managing social media and more. However, due to the flexible nature of my function, I get to enjoy a lot of time in the lab at the moment. I greatly enjoy this and I have missed being in the lab very much. The freedom to explore and design a project in a relatively independent way was one of the reasons iGEM really appealed to me. I can't wait for us to show you in a future newsletter or at the Jamboree how far we developed our system!

Labtime!

It's summer, which means that currently we are working in the wet lab on our proof-of-concept and in the dry lab on the model, human practices, public engagement and much more. As always, labtime is not without struggles and troubles, but we are finally able to see and work with each other every day.

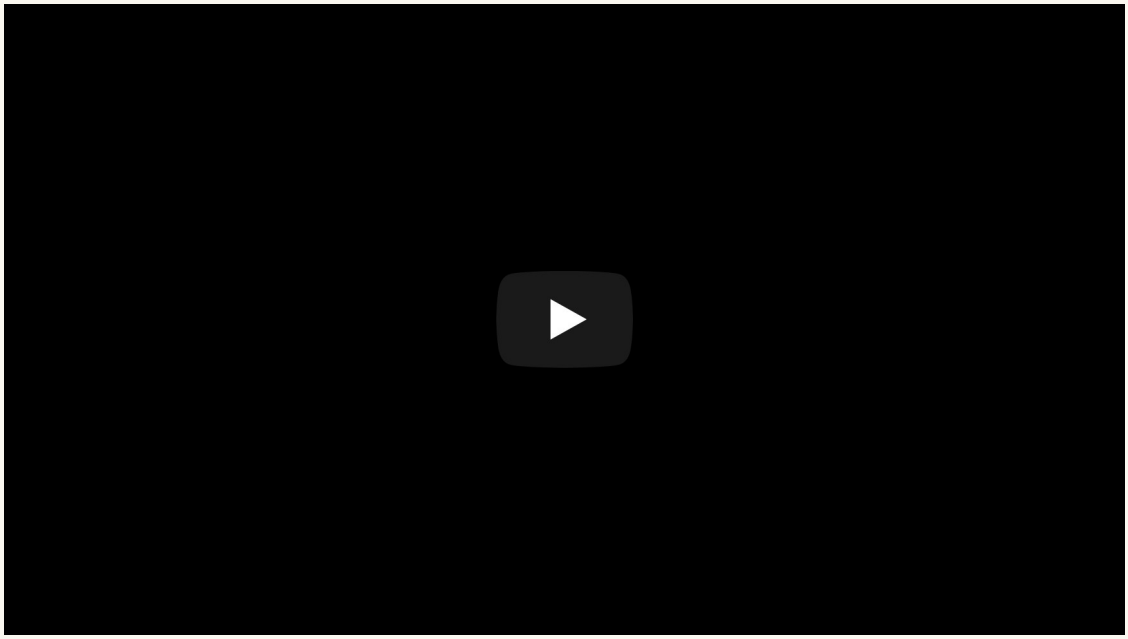




This plate (photographed under UV light) contains some colonies with a fusion of the RelE toxin gene, which represses transcription, and the TetOn promoter, which is a promoter that can be induced by adding tetracyclin (or analogues) to the medium. However, since it is a transformation done with a ligation (molecularly 'glueing' DNA fragments together, which doesn't have 100 % efficiency), there are some colonies that contain fluorescence genes, which are the colonies giving off a green hue. During the restriction and following that the ligation, the gene for the fluorescent protein should be excised out of the plasmid. By screening for colonies that aren't fluorescent, we can find out which colonies contain the version of the plasmid we are hoping for.

Promotion video

Curious about what our project exactly entails, or just up for a great movie? Watch our promotion video!



Our very own wiki

This month we worked hard on being able to show our project to the world via a website. As of now, we are very proud to show it to you! It is still a work in progress, but you can already take a look at our project, team and sponsors.

Our website!

Microbe of the Month: July

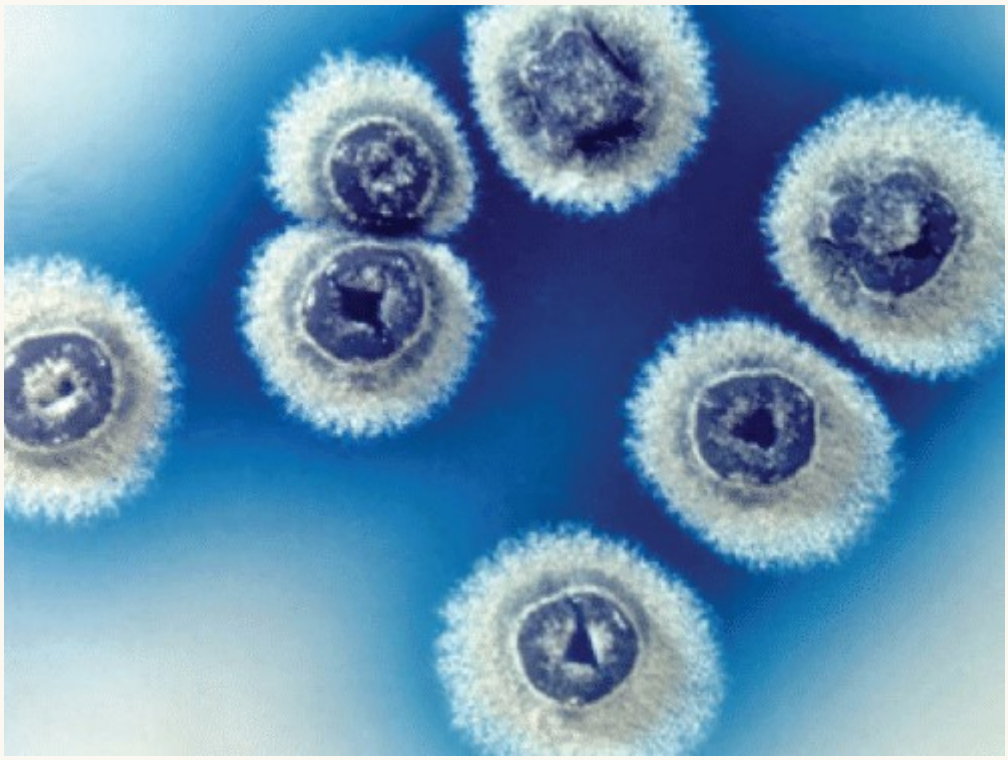
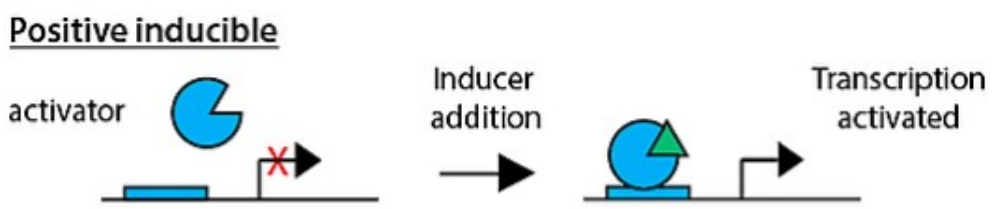
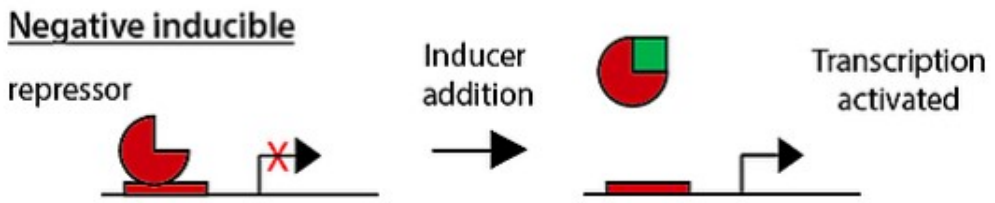


photo: Keith Chater, recent advances in understanding Streptomyces, 2016

This month, we will look at my personal favorite microbes: *Streptomyces*, particularly *S. coelicolor*. Their name *coelicolor* comes from the beautiful blue color around their colonies, caused by actinorhodin (an antibiotic) production. These microbes live in the soil and break down organic material that falls on the ground. They are responsible for the 'earthy smell' that you sometimes can smell when you walk through forests or after it has rained. Streptomycetes are filamentous, Gram-positive bacteria. The majority (over two thirds!) of antibiotics that have natural origin are made by these bacteria. Further, they also produce some anti-cancer compounds and it is thought we have by far not extracted all pharmaceuticals we can from these microbes. A lot of these are thought to be encoded by 'criptic' genes however (genes that look like they produce a certain type of compound, but seem to never be active). Further, these microbes are used as bacterial vectors to express eukaryotic proteins in biotechnology (proteins from e.g. animals, fungi, plants), since they are better than *E. coli* at expressing and especially folding these proteins. Their lifecycle is interesting: they sporulate, meaning they land somewhere, after which they start to produce a hyphal network. When food starts running low, the middle of the colony starts to die off. This is when they start producing their antibiotics, so that they alone have the opportunity to break down their dead cells, which contain valuable nutrients and energy. At this stage, the cells start to sporulate again.

Inducible promoter





Source: Gearing, M. *Plasmids 101: Inducible Promoters*. 18-01-2018

In our project we will use inducible promoters to ensure that the transformed cells can only live in a contained environment. Promoters control whether DNA is transformed into RNA (called transcription), this RNA is needed to produce the final protein. In the case of inducible promoters, another compound needs to bind to the promoter, before the promoter can activate the transcription. The transcription can be activated in two ways. Firstly, the compound can bind to the promoter, which then binds to the DNA to activate the transcription. On the other hand, the compound binds to the promoter, which then loosens from the DNA, to activate the transcription. The need of this compound enables us to grow cells only in th conditions where the compound is present and thus to keep the cells only at the pre-defined location.

Quizzes

X	U	R	E	D	N	A	V	L	R	B	B	H	B
E	B	R	Z	L	C	C	B	G	M	E	G	I	Y
T	I	N	F	A	B	O	D	I	M	S	A	L	P
O	O	K	O	G	F	I	N	T	M	I	N	S	Q
X	S	V	E	N	E	G	C	S	H	I	W	J	O
I	A	T	C	V	R	N	Z	U	T	K	L	O	W
N	F	Y	F	B	T	D	Q	E	D	R	F	J	I
V	E	R	E	C	U	D	N	I	T	N	U	B	Q
R	T	J	P	R	O	M	O	T	E	R	I	C	D
N	Y	S	N	O	I	T	A	L	U	G	E	R	T
A	X	R	E	E	I	D	I	P	F	G	L	I	D
W	L	V	N	T	U	P	N	E	D	I	E	L	E
T	N	E	M	N	I	A	T	N	O	C	O	I	B
H	D	S	N	I	X	O	T	I	T	N	A	S	S

Can you find all the words?

- Antitoxin
- Biocontainment
- Biosafety
- Construct
- DNA
- Gene
- GFP
- iGEM
- inducer
- inducible
- Leiden
- Plasmid
- Promoter
- RNA
- Regulations
- Toxin

Collaborations

At the moment, we are working on setting up a collaboration with team Manipal BioMachines from India. They are working on creating endophytic bacteria (residing in plants), so that they can improve crops without needing to genetically engineer the plants

themselves. Really interesting!

Sponsors

During this last month, we acquired some sponsors! We want to thank them for supporting our project and we hope that they inspire others to support us as well!