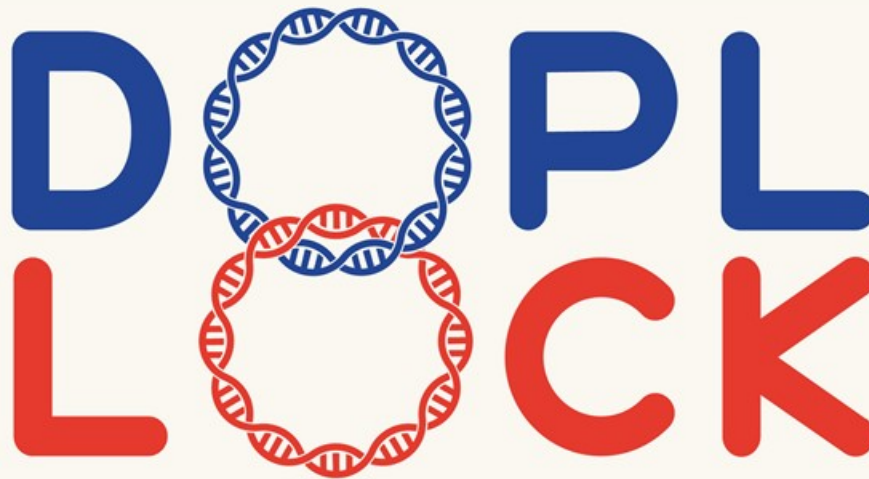


Newsletter August



Dear reader,

August has gone by in the blink of an eye! Our time in the lab is coming to an end. Therefore, this month, we will try to summarise our preliminary results for you (although do please keep in mind we are nowhere near done yet).

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Introductions

Human Practices Manager - Lisa Kleinjan

Hi guys! My name is Lisa. I am a bachelor Life Science & Technology student. To challenge myself, I signed up for the iGEM Leiden 2021 team where I am now the Human Practices Manager. Having this role, I will be responsible for the connection between our project and society. We've met with several stakeholders and there are so many fun



meetings planned in the coming months. I'm curious about all those upcoming meetings, to make our project even better! During iGEM, I hope to develop lab skills and grow as an individual. I'm looking forward to making it a few more fun months with this amazing team!



Public Engagement Manager - Quint van Loosen

Hi all! My name is Quint van Loosen and I am a master student in Molecular Genetics and Biotechnology at Leiden university. My role is that of Public Engagement and Education Manager. An amazing task if you ask me, because I get to convey my enthusiasm for synthetic biology to everyone else. I take a lead in educating the new generation of biologists about biosafety and GMOs. We will visit museums and schools to spread the DOPL LOCK message and entertain, as well as educate the public. I hope my love for bringing science to the broader public will shine through and take our iGEM project to the next level by having a two-way discussion with people outside the scientific field!



Entrepreneurship Manager - Iggy van der Meulen

Hi all! My name is Iggy van der Meulen and I am currently a second year student in the bachelor Life Science & Technology. I got acquainted with iGEM when I was working on my high school research paper, for which I collaborated with members of the 2017 iGEM Amsterdam team. This sparked my enthusiasm in synthetic biology and is also the reason for joining the iGEM Leiden team the first chance I got. Participating in iGEM this early in my studies has been a great opportunity to already obtain the knowledge and practical skills required to execute our own project. As the Product design and entrepreneurship manager, I mainly focus on the practical implementation of our project in society. With this, the goal is to achieve a real-world impact in the progression of biosafety from the efforts of the entire iGEM Leiden 2021 team.

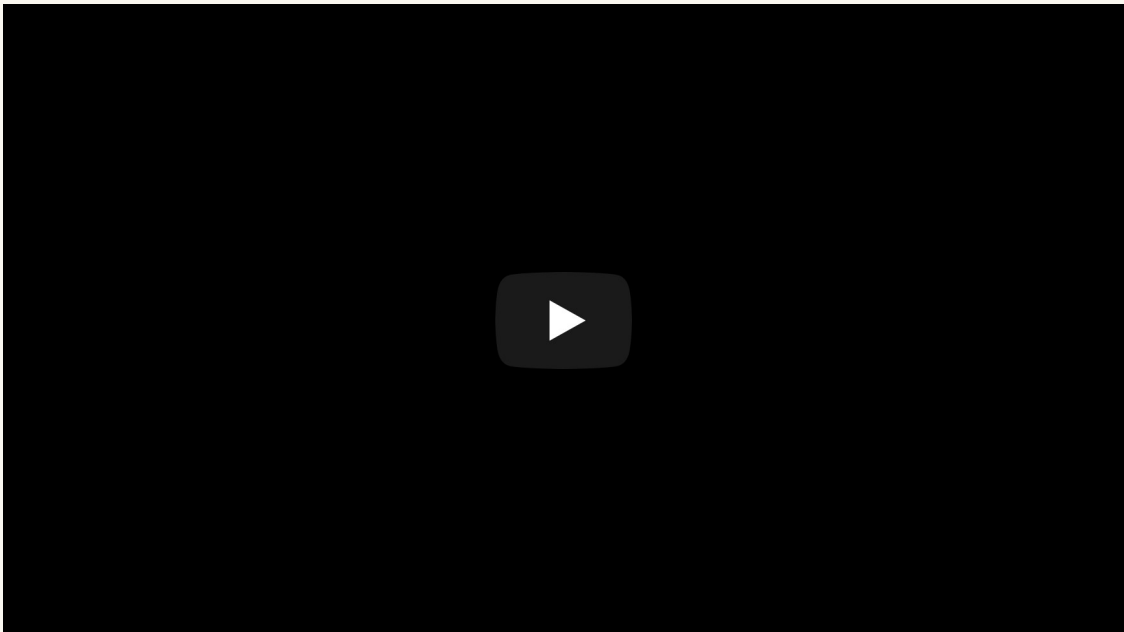


Labtime!

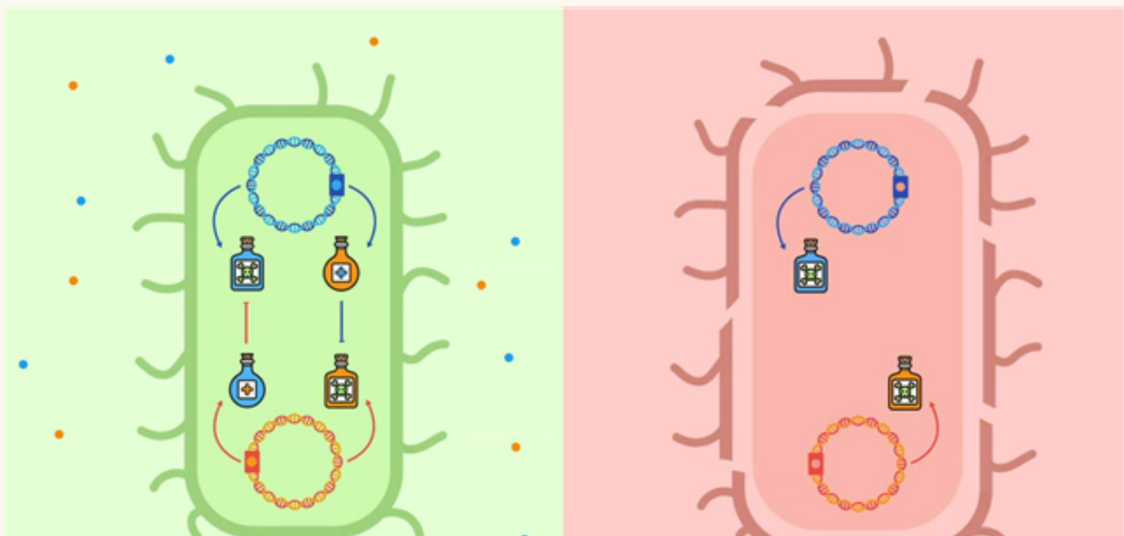
As we have been working hard in the lab for over 7 weeks now, labtime is finally starting to come to a close, and the time has come to start analyzing our data. This year, the lab has offered a significant challenge: it turns out that cloning toxins is quite difficult (as one may expect). However, that does not mean that we have not been gaining any results. Please, have a little more patience to see our full results! We hope to make it worth your while. See our newsletter next month and be bedazzled by our graphs and figures!

Promotion video

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



Inducible Promoter



As you might have seen in our promotion video, we will work with a so called inducible promoter to make sure that our bacteria will only survive if and when we want it to. You might wonder what this is. Firstly, you need to know what a promoter sequence is: it is a region of DNA, that is upstream of a gene (i.e. it is 'read' first by the cell), which tells the cell if and how much protein or RNA should be made of a certain gene.

An inducible promoter is a promoter that is active under certain conditions. This can be anything: active when a certain antibiotic or sugar is present, a temperature threshold that needs to be reached, or a promoter that is only activated under certain wavelengths of light.

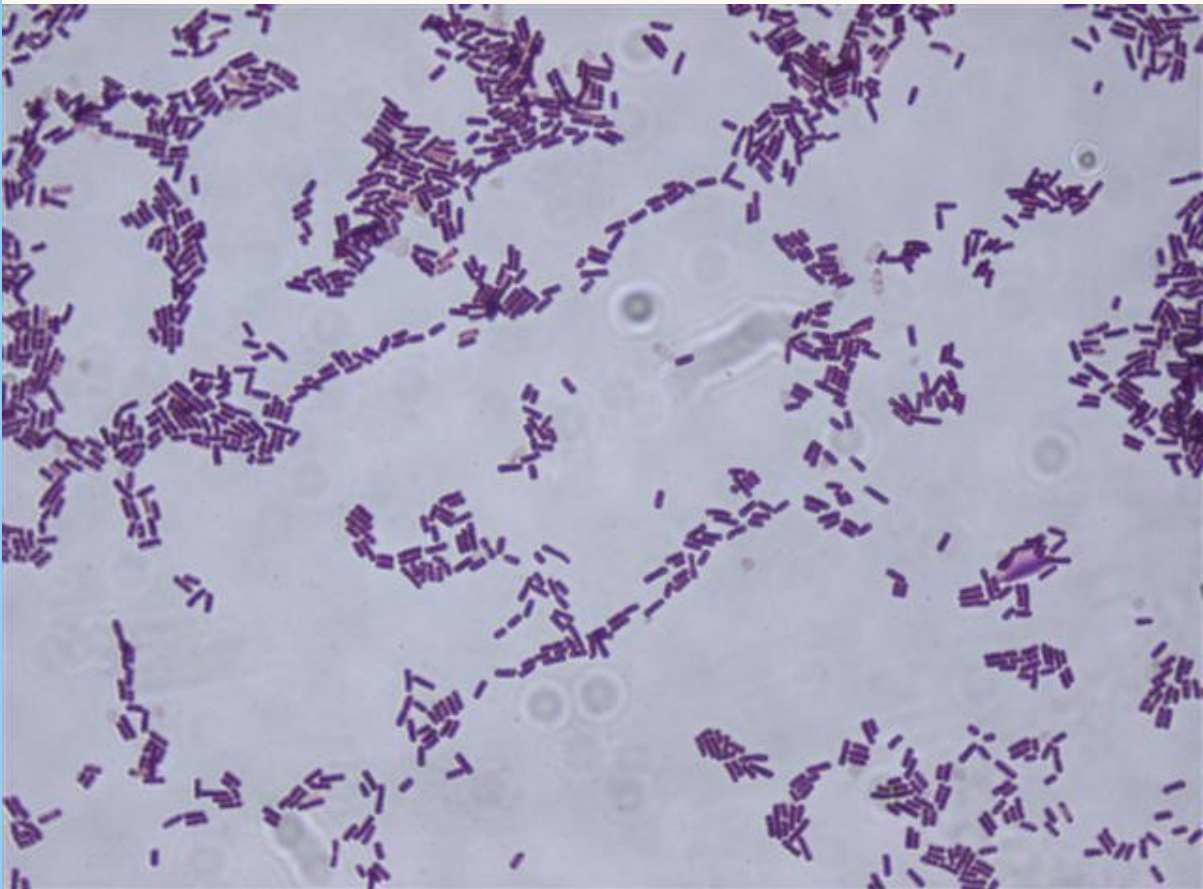
For our system, we will use the pBAD promoter, a promoter that is active when the sugar arabinose is present. Arabinose is unlike glucose, the sugar of choice for most organisms, a pentose sugar (5 C atoms). In nature, the presence of this sugar in the absence of glucose makes the cell change its metabolism to be able to digest pentose sugars, rather than hexose sugars like glucose and fructose. This is convenient for us, since we can use glucose as an 'off-switch' for our genes, and arabinose as an 'on-switch'. This lets us work with our toxic genes without quickly killing our cells, and allows us to make sure that the antitoxin is only active in places where there is only arabinose and no glucose - greatly limiting the available niches where our bacteria can thrive. In future implementations of our project, this promoter can be switched for a different inducible promoter to meet individualised needs depending on the application of the system.

Crowdfunding



Very soon, we will start our crowdfunding campaign! Please keep an eye on our social media pages for more details. While we have been very busy in the lab, we have also been working on a new video, which you will be able to find on YouTube, Facebook, Twitter and Instagram as soon as it is done. If you are as enthusiastic about our project as we are, please consider chipping in. Even small amounts are very welcome! This will

Microbe of the Month: August



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In September, we will discuss yet another microbe of amazing importance for biotechnology: *Bacillus subtilis*. *B. subtilis* is also known as 'the Gram-positive *E. coli*', since *E. coli* is Gram negative but they share many similarities. Like *E. coli*, they are rod shaped, about 1 μm in diameter. *B. subtilis* can divide in two ways: it can divide symmetrically, producing two daughter cells and asymmetrically, a cell division which will produce a single spore. Like Streptomyces spores, *B. subtilis* spores are highly resistant to extreme pH and temperature ranges and can survive for many years without water. One very interesting characteristic of *B. subtilis*, is that it is naturally competent. This means that it has the natural capacity to take up DNA from its surroundings and use it as though it were its own. This makes it both interesting to study and easy to work with. Combine this with its division speed that is similar to *E. coli*'s, and you can see why it has made it far in the world of biotechnology.

This natural competency is generally induced when nutrients in its environment start running low, especially in amino acids. In the lab, this means that this happens when the bacterium is at the end of its logarithmic growth (when growth has slowed down). Biotechnology is not the only application of *B. subtilis*, however. If you are familiar with the Japanese food called nattō, you know these bacteria! Nattō is made from beans that are fermented. They are often eaten for breakfast in Japan. To people unfamiliar with them, the texture and looks of this food might be a little unappealing:





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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! You can take a look at our project, team and sponsors.

[Our website!](#)

Quizzes

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

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

This month is a little more challenging! Horizontal and Vertical, both directions.

Try to find these words:

Antitoxin, arabinose, bacillus, fermenting, hexose, inducible, laboratory, pentose, pipette, promotersequence, spore, toxin

Collaborations

To give you a small update on our collaboration with Manipal: we have decided to make an entrepreneurship plan together. Team Manipal is working on using *B. subtilis* as a plant supplement. It would live in and around the roots of vegetables and make them grow in a better way. Of course, this would require release into an uncontrolled environment, which is where we hope to come in. To this end, we will make a shared survey to dive into public opinion surrounding this idea in India and here in the Netherlands. As soon as it is out we will send it on our social media platforms. Check out their instagram (@manipalbiomachines) for their promovideo and project details. Fascinating stuff!

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!





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