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Denis Dupuy², Marie Beurton-Aimar²
¹ with an equal contribution to this work ² Instructors
Team Bordeaux 2013

Floriane

Jeveta

Alexandre

Mounir

Jean-Rémy

and others who were unable to come...
The yoghurt's choice

- **Vector for lactic acid bacteria** in the digestive tract
- Ideal **support** to begin an iGEM project
- **Probiotics** are commonly consumed as part of fermented foods
- Example of probiotic: **Kefir**

kombuchakefir.com
Probiotic effects on metabolism and health

Kefir – a complex probiotic Edward R. Farnworth
Our project goals

- Production of flavoured yogurts with beneficial effects on the organisms and medical properties without using chemical substances
- Commercial interest
- Interest for consumer
**Preparation of Yogurts:**

- Two species of bacteria
- **Streptococcus** growth
- **Lactobacillus** growth
- Fermentation: 3 to 4 hours only
- Extracellular polysaccharides
Material and methods

- Make competent E.coli
- Test of the red biobrick on E.coli
- Red colonies put in a liquid culture
- Promotor HlbA added to the plasmid
- Insertion in Lactobacillus

Project: Dyes and Flavour

Project: Resveratrol

Human Practice

Conclusion
Raspberry dye:

- One of the most expensive dye
- Produce directly in the yogurt
- Two enzymes are necessary
- Two biobricks needed
**Project: Dyes and Flavour**

**Lycopene: red**

- **geranylgeranyl pyrophosphate synthase**
- **phytoene synthase**
- **phytoene desaturase**

**BBa_K1148000** \(\text{crtE (phlbA)}\)

**BBa_K1148001** \(\text{crtB (phlbA)}\)

**BBa_K1148002** \(\text{crtI (phlbA)}\)

**BBa_K1148003** \(\text{crtE + crtB + crtI (phlbA)}\)

**Team Presentation**

**Introduction**

**Material and Methods**

**Project: Dyes and Flavour**

**Project: Resveratrol**

**Human Practice**

**Conclusion**

iGEM Bordeaux Team 2013 – Super Yoghurt
β-carotene and zeaxanthin: orange and yellow

BBa_K1148004: crtY under hlbA promoter (phlbA)
BBa_K1148005: crtZ under hlbA promoter (phlbA)
Geraniol: rose flavour

BBa_K1148011: the gene for monoterpenyl-diphosphatase under hlbA promoter (phlbA)
**Project: Dyes and Flavour**

- **Myrcene: lavender flavour**

Myrcene/ocimene synthase

BBa_K1148010 : TPS10 under hlbA promoter (phlbA)

**MONOTERPENOID BIOSYNTHESIS**
Limonene: citrus flavour

BBa_K1148008: the gene for limonene synthase 1 under hlbA promoter (phlbA)
- α-terpineol: pine flavour

**BBa_K1148009**: TPC-CIN under hlbA promoter (phlbA)

1,8-cineole synthase
What is resveratrol?
Why resveratrol?

Anti cancer properties

The French paradox
Resveratrol molecule
Enzymatic pathway

\[ p\text{-cumaric acid} \xrightarrow{\text{CoA}} \text{coumaroyl-CoA} \xrightarrow{\text{4CL}} \text{hydroxyphenyl-propionic acid} \xrightarrow{\text{yeast}} \text{trans-resveratrol} \]
What we wanted to do and how?

- Include resveratrol pathway in *Lactobacillus*. 
Human Practice

- The Virtual Lab
- The BioGame
- iGEM House
The Virtual Lab

- **Virtual Lab** = a dedicated *Online Information Management System* to help iGEM teams to visualize the progress of their *project in real time* and *share* with their off-site team members.

- **Thanks** to our *bio-computer engineer students*:
  - Maëva VEYSSIERE
  - Jonathan MELIUS
  - Clément DELESTRE
The BioGame

Who said Biology was boring? ...

- As for biologists
- As for non-initiates
- Goal: Get your project parts
- How: Answer Biology questions

... play Biology and have FUN!
iGEM House

- Synthetic Biology and House of the future.

=> A house in which many iGEM projects would be every days used tools.

WiFi Coli, a Communicolight System, Mexico 2000
Colors and flavors
Design of new potential biobricks
⇒ Manage to end these constructions for a transformation in *E. coli* then *L. bacillus*

Resveratrol
Extraction of RNA from grapevines done
⇒ Biobrick construction to produce resveratrol

Human practice
Thanks

- Denis Dupuy\(^1\)
- Marie Beurton-Aimar\(^1\)
- Cécile Quéré\(^2\)

\(^{(1)}\) Instructors \(^{(2)}\) Doctoral student
Thank you for your attention