The Edinburgh Genome Foundry
Lab Automation as a Service

V. Zulkower, April 2019

RESEARCH COUNCILS UK
THE UNIVERSITY OF EDINBURGH
UK Centre for Mammalian Synthetic Biology

Synthetic Biology centres in the UK

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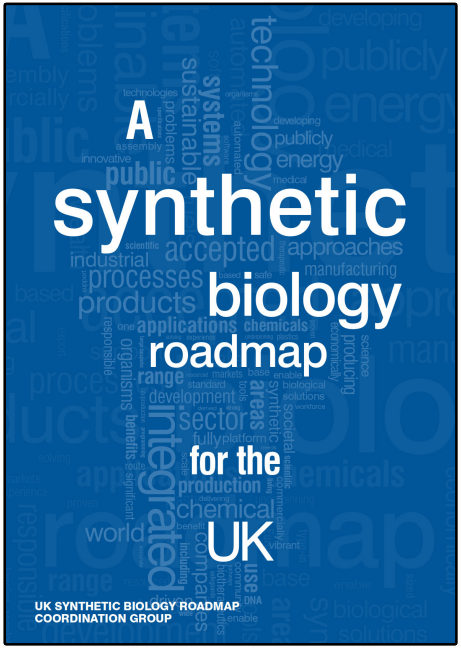

Synthetic Biology UK Roadmap, 2012

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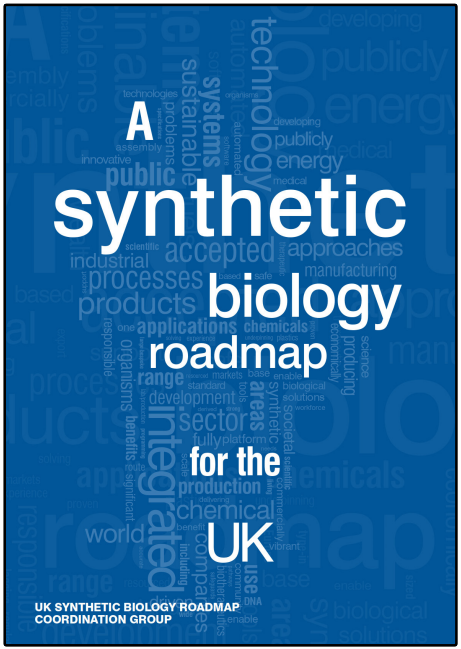

Synthetic Biology UK Roadmap, 2012

1. **Invest in a network of multidisciplinary centres to establish an outstanding UK synthetic biology resource**

   Facilitating communications and learning, and networking experts across disciplines with customers, public and private interest groups are common themes running through this roadmap. One key element will be to provide access to cutting-edge resources for both the academic community and industry.

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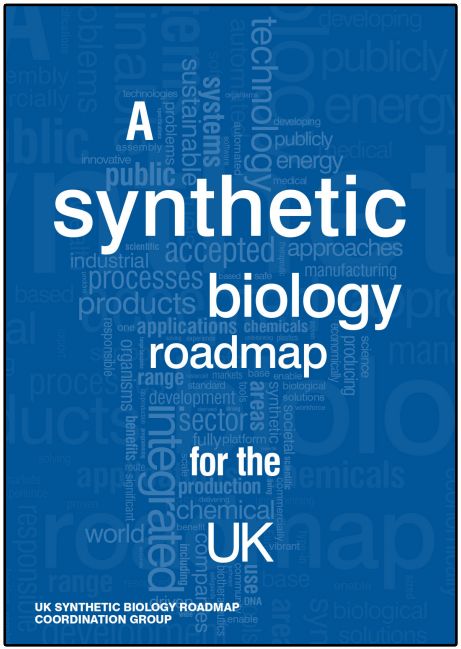

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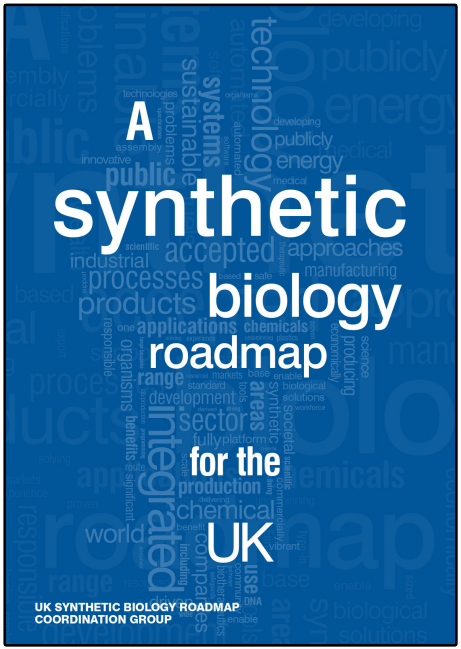

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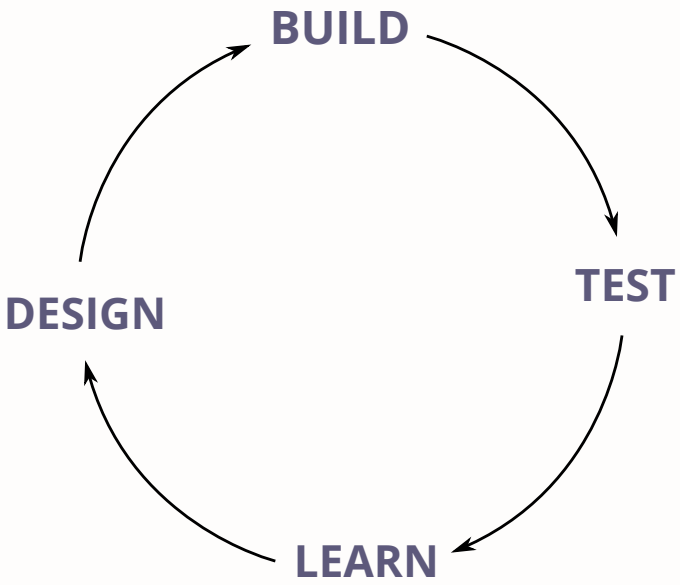

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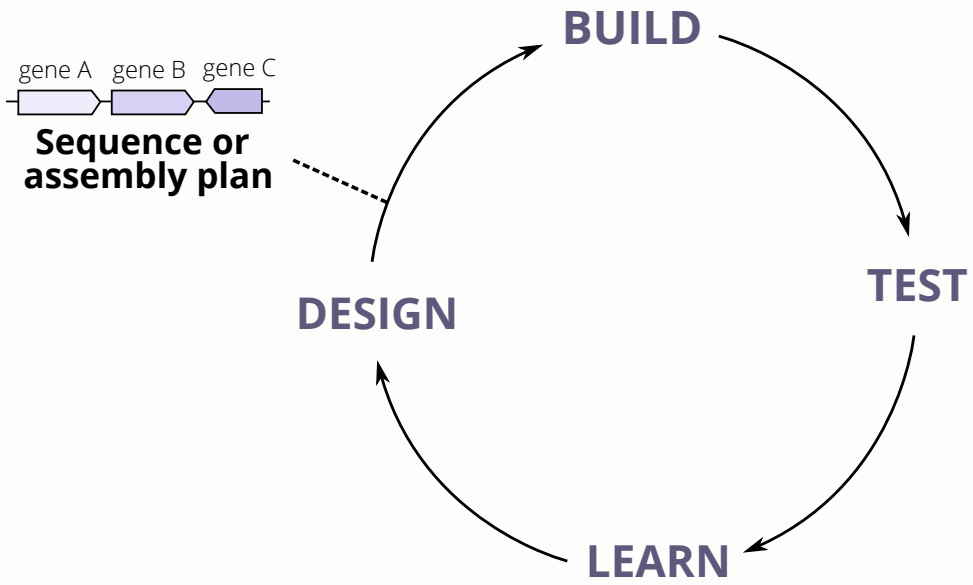

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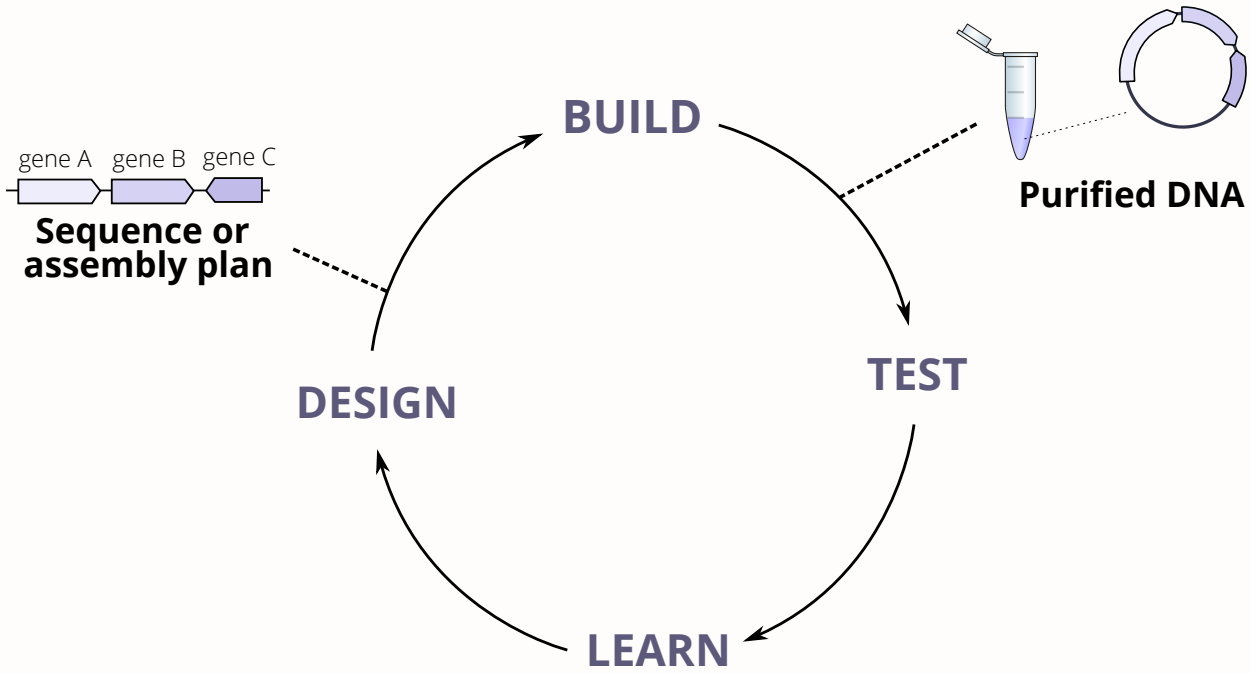

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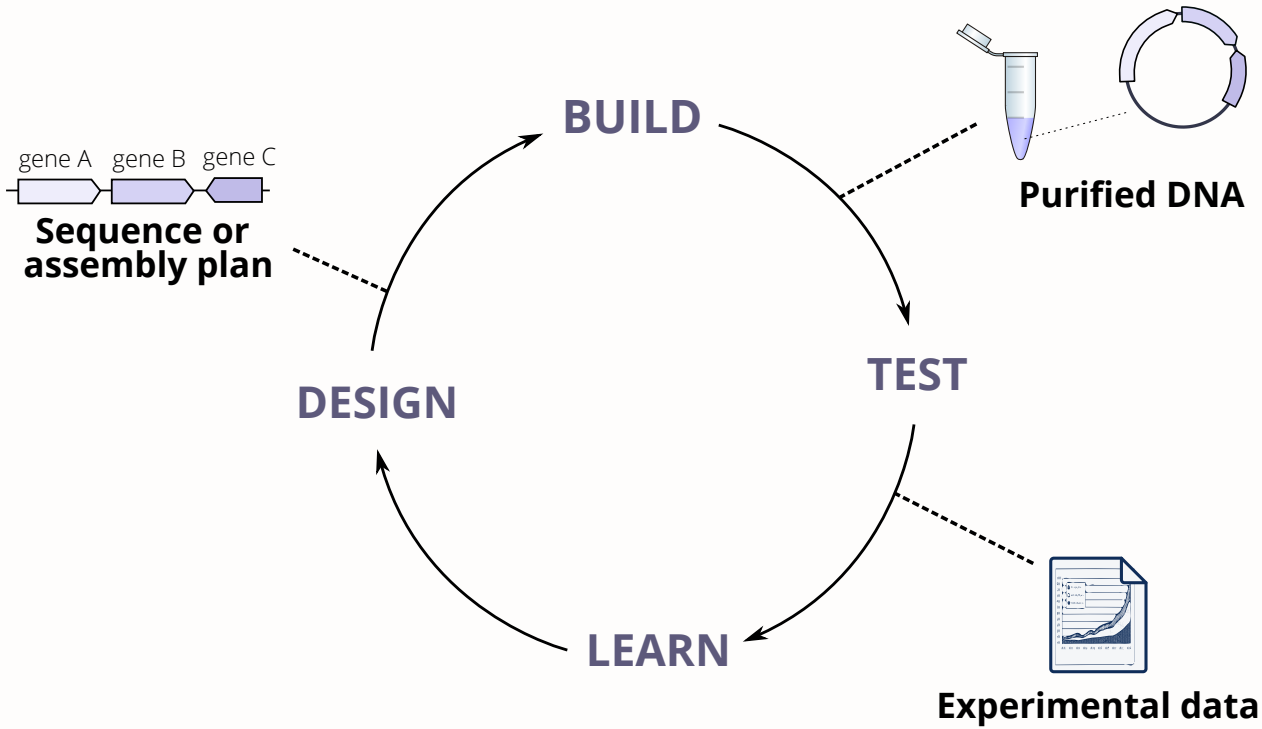

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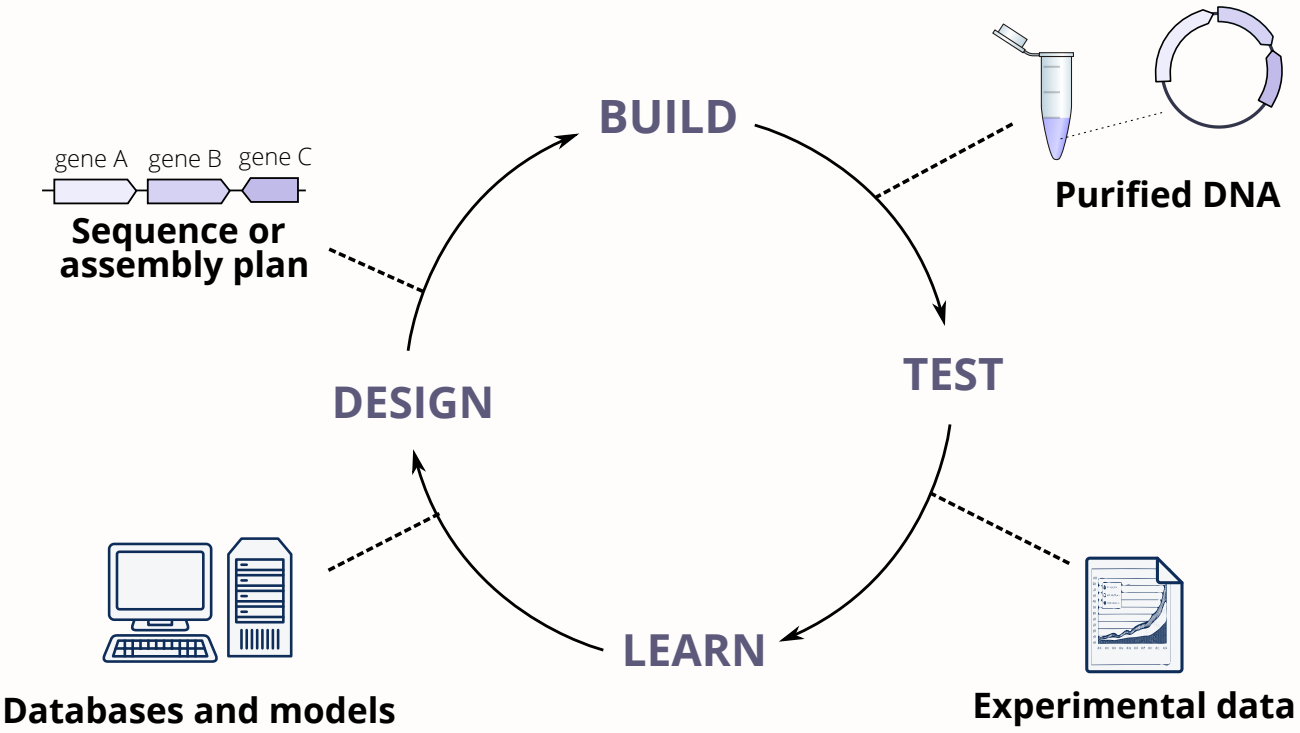

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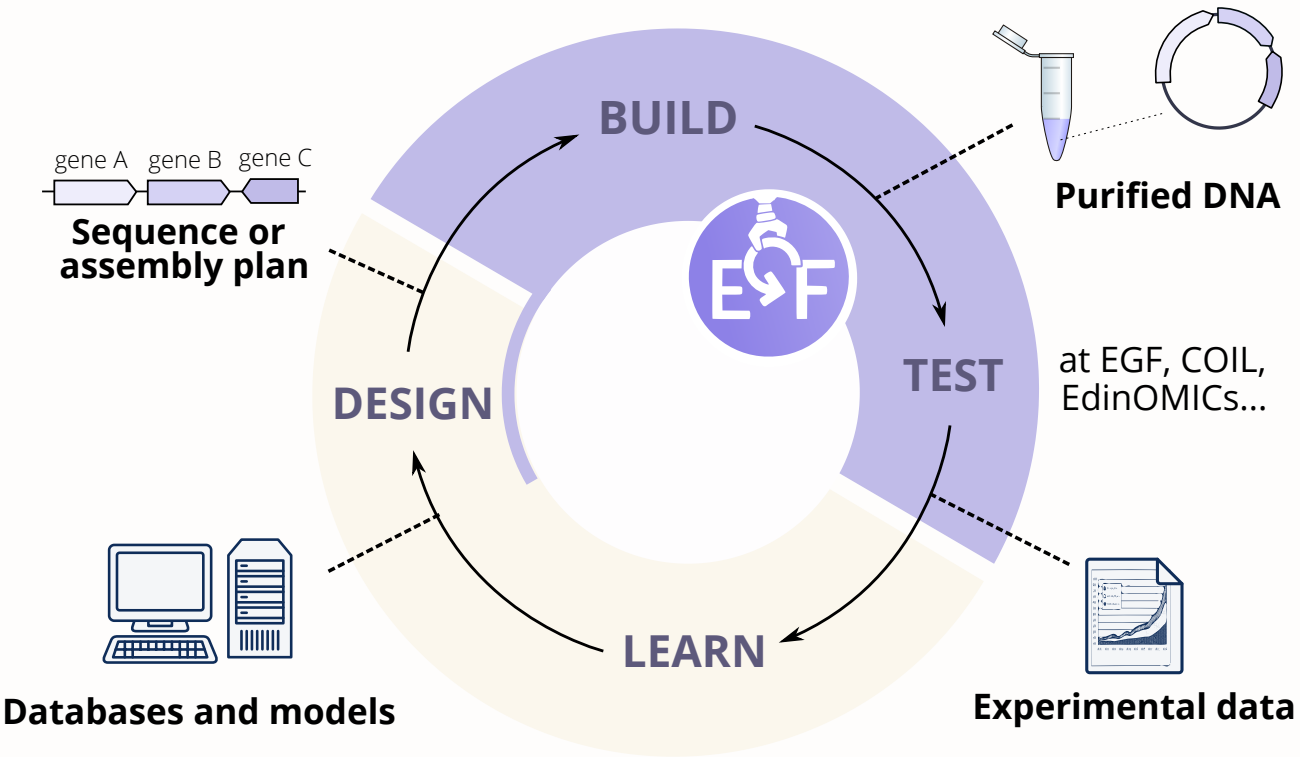

Our favorite assembly standard: EMMA

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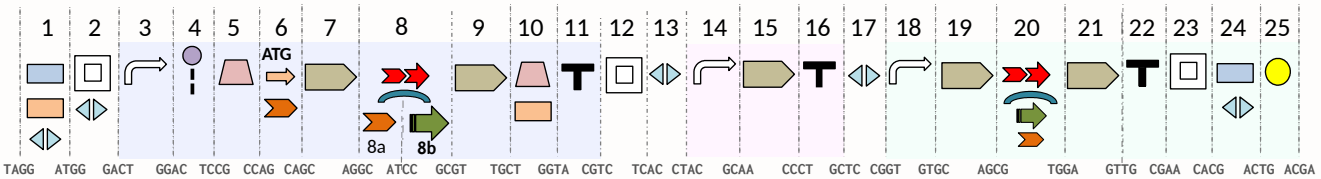

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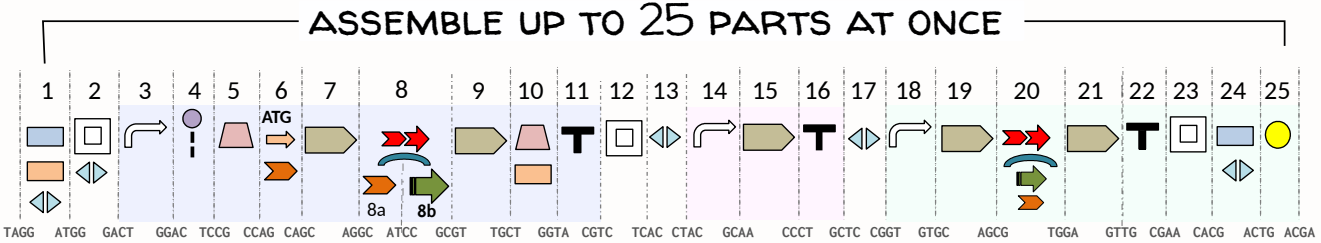

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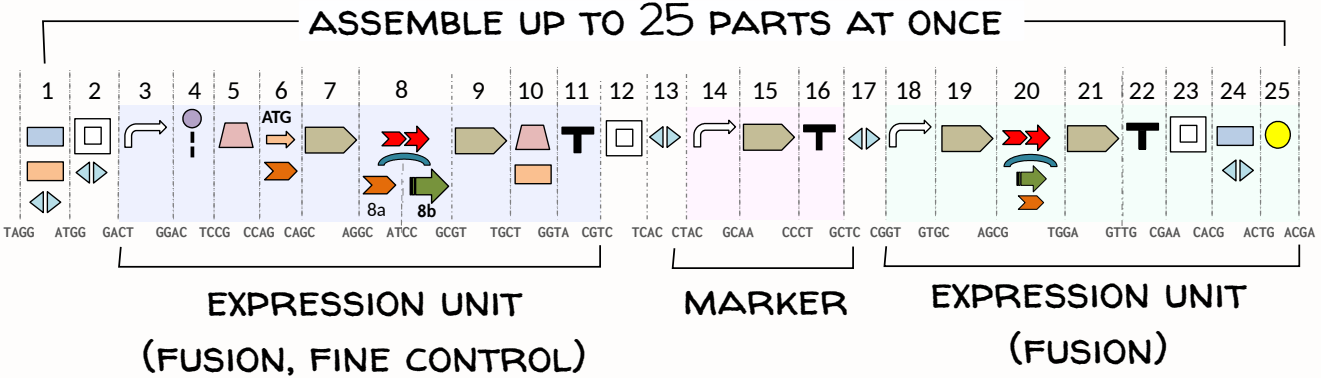

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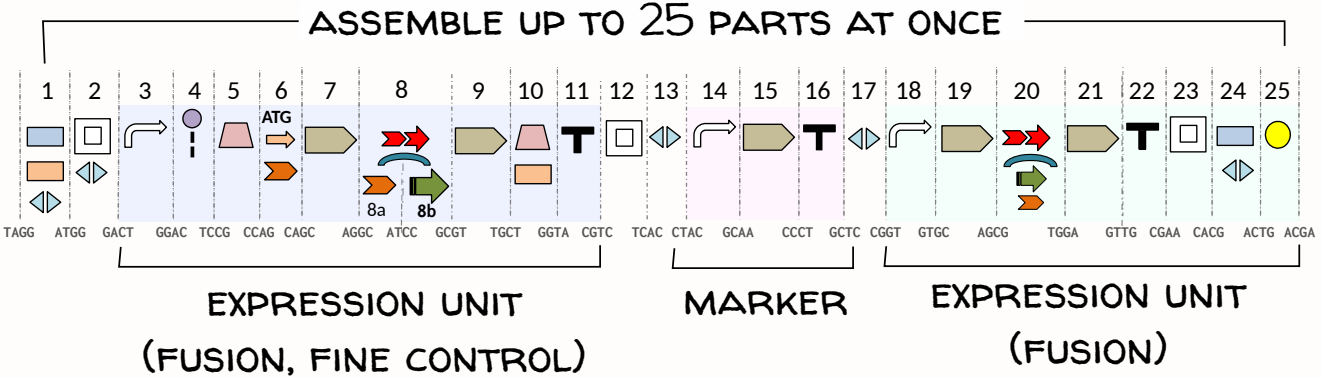

Used at the EGF for:

- Mammalian expression vectors,
- Viral gene therapy projects
- CRISPR studies
- Chromosomal insertion for structural biology projects...

How to work with us

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1. PROJECT VALIDATION

GENERALLY 1–2 WEEKS

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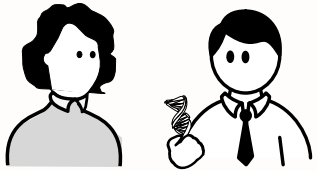
GENERALLY 1–2 WEEKS

2. DNA PARTS ORDERING



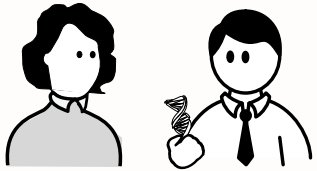
GENERALLY 4–6 WEEKS
FOR PARTS 1–5KB
~ 10C / BP + £40 / PART

How to work with us

1. Project validation

Generally 1–2 weeks

2. DNA parts ordering



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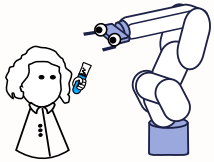
3. Assembly on our platform



Generally 1–3 weeks
~ £30 / assembly

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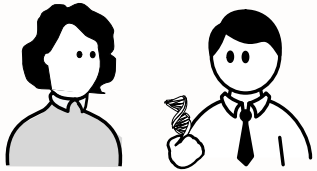

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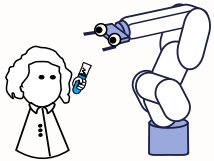

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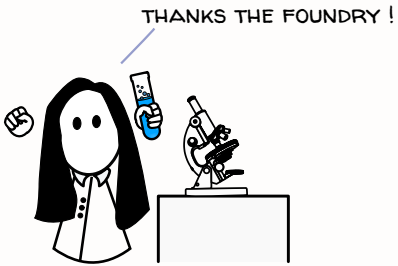
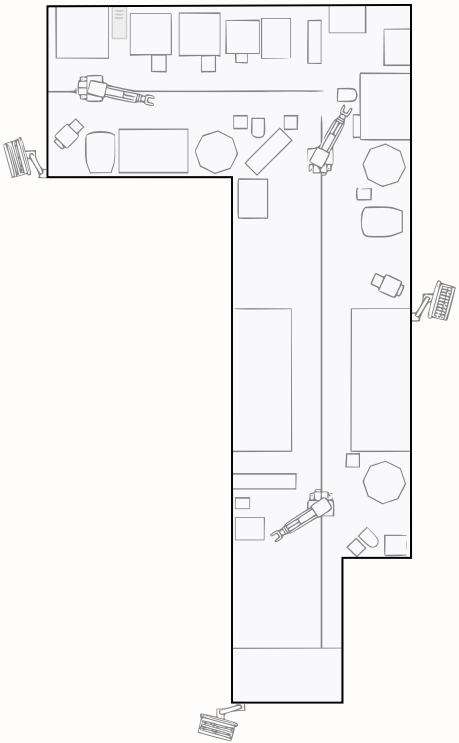
4. Happy customer



The EGF's High-Throughput robotic platform

The EGF's High-Throughput Robotic Platform

EGF robotic setup



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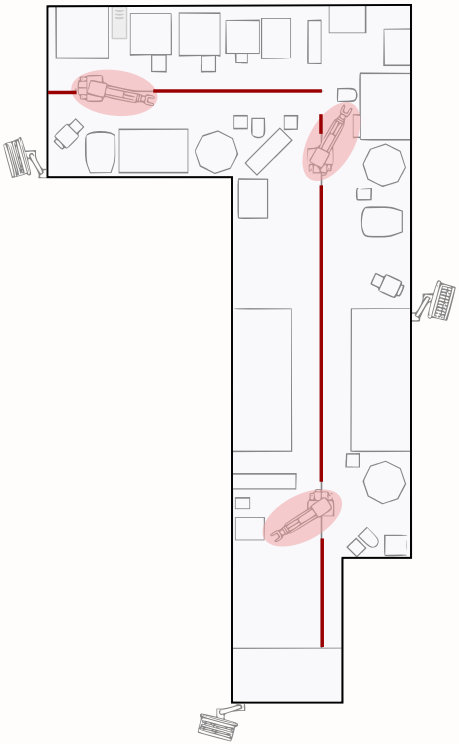
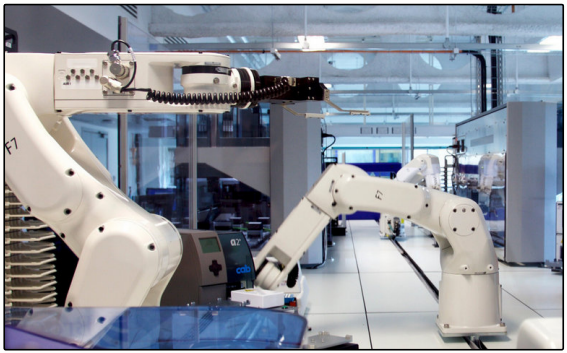


Robotic arms



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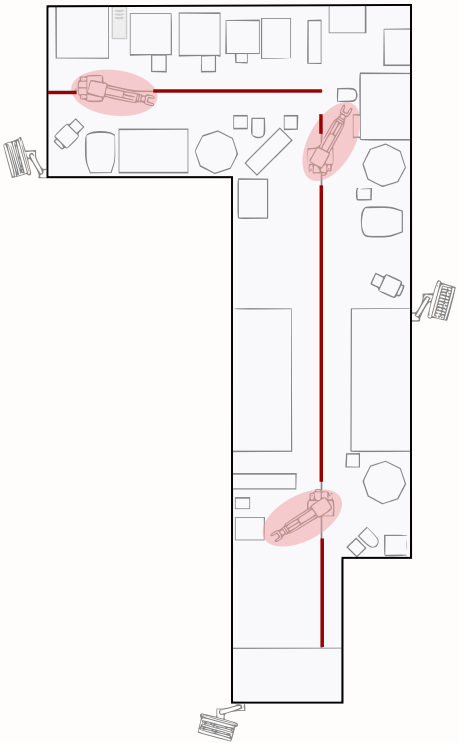

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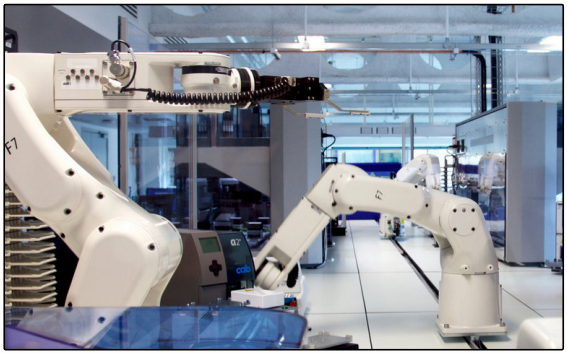
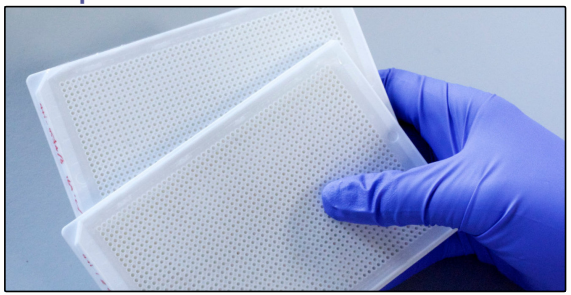


Microplates



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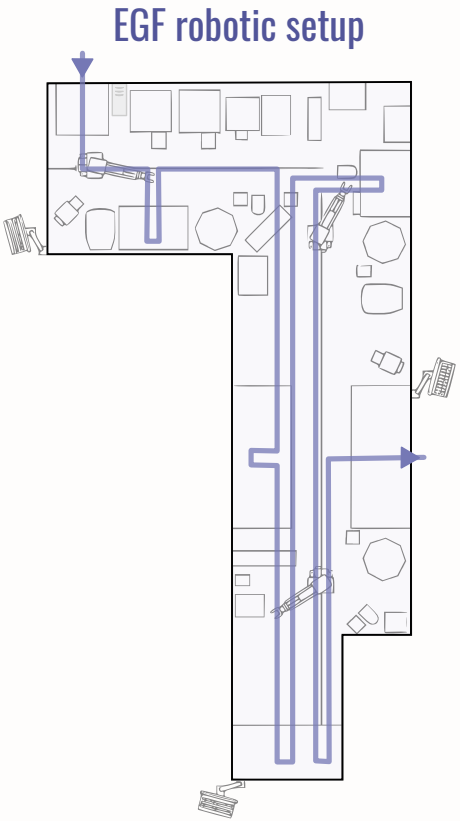

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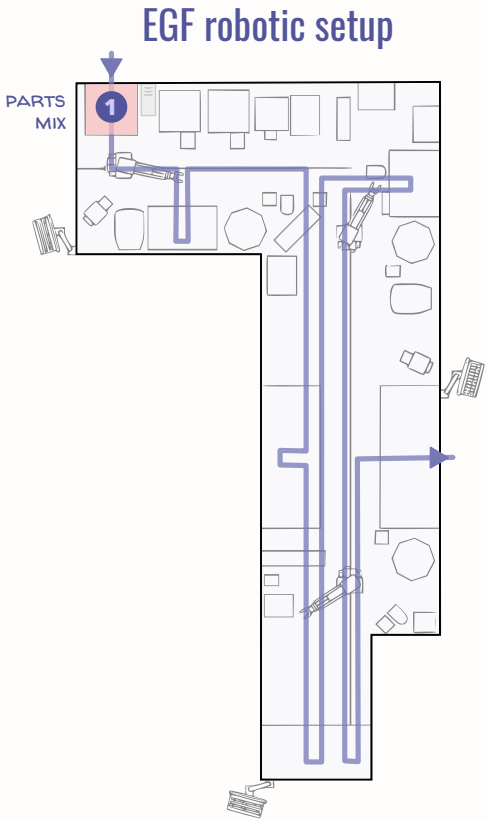

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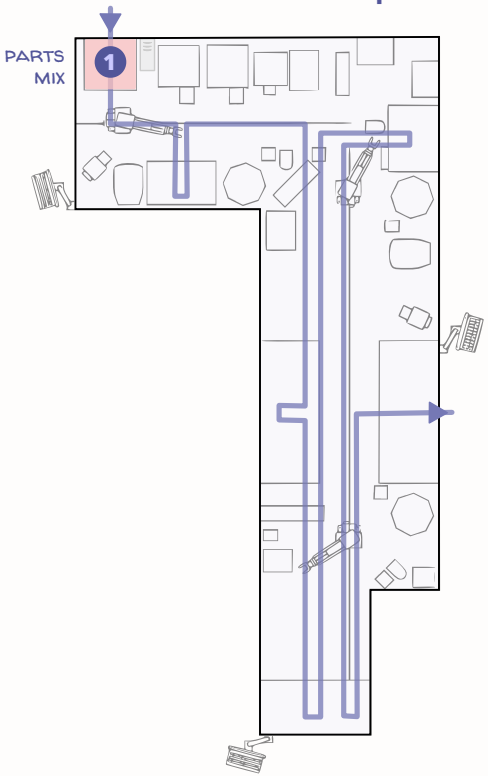
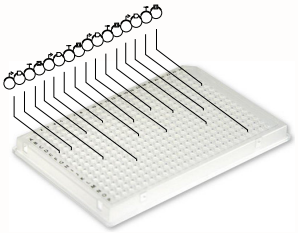


PLATE WITH DNA "PARTS"



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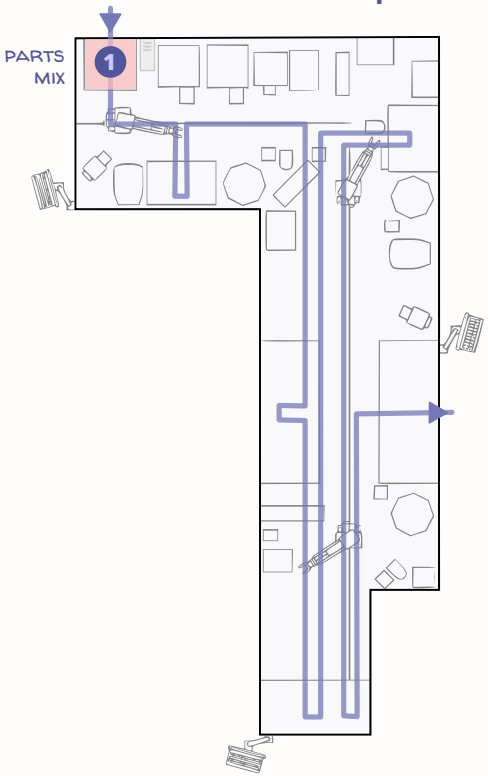

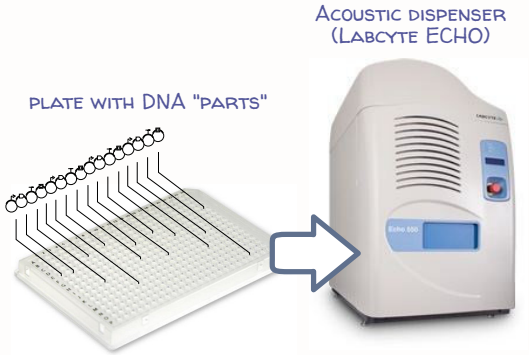

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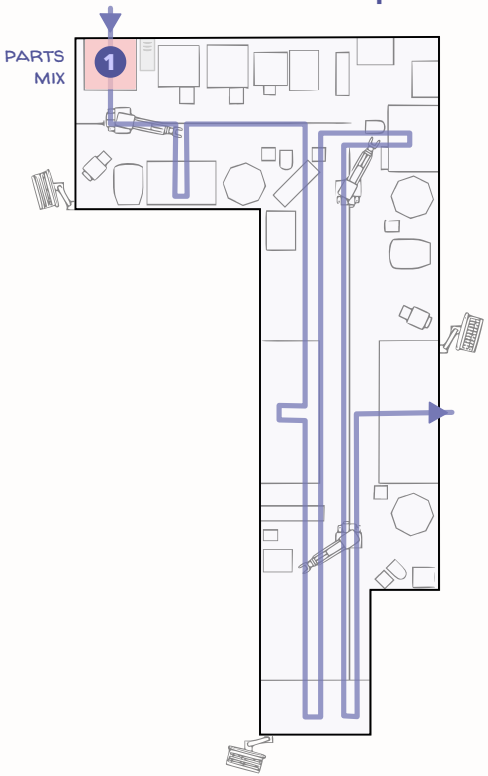

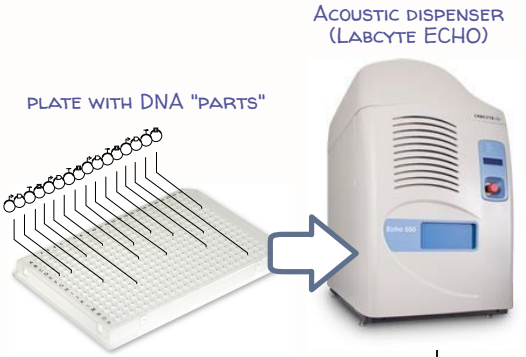

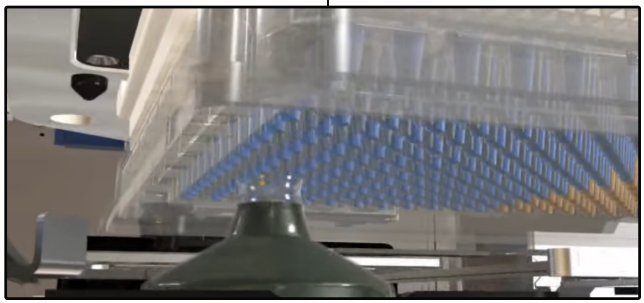

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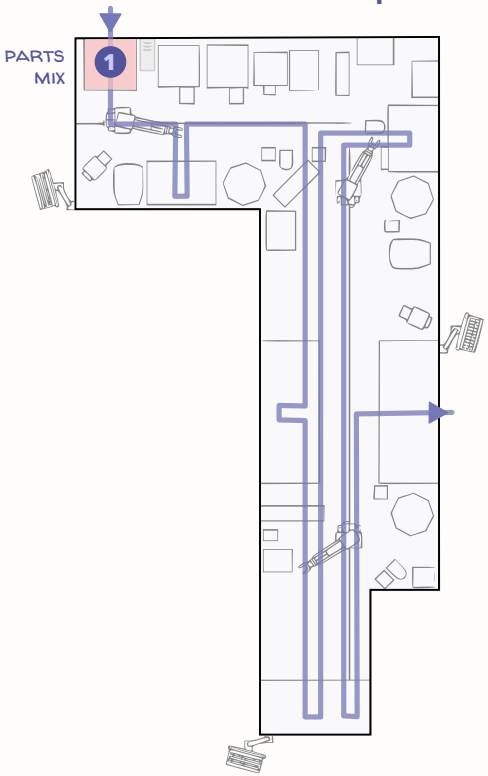

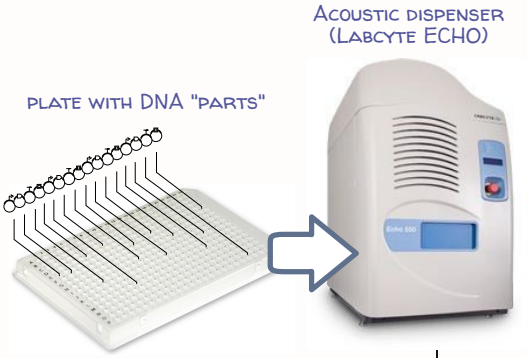

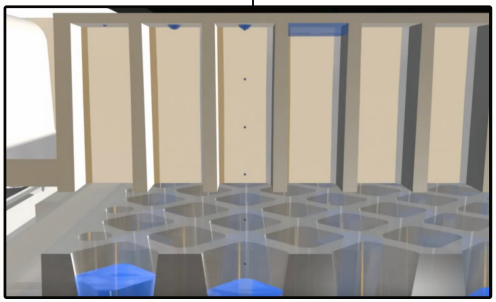

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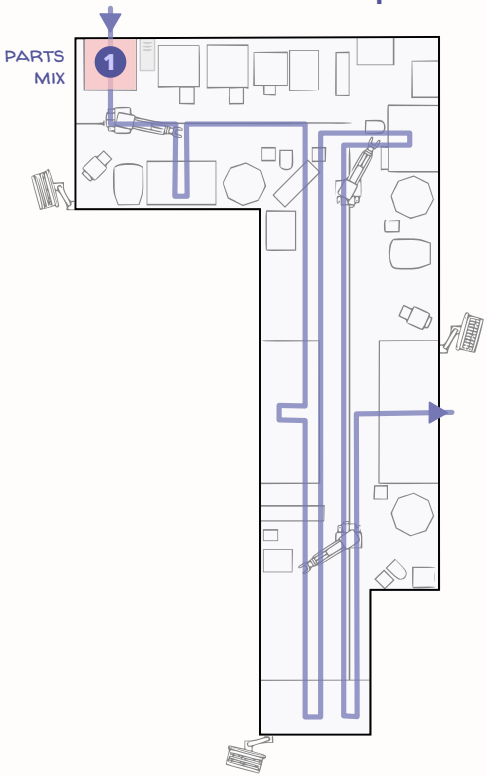

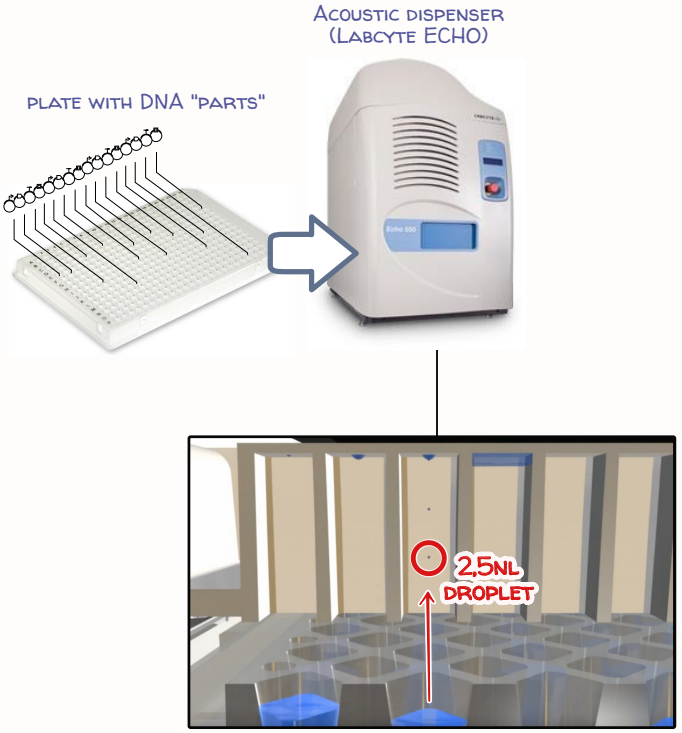

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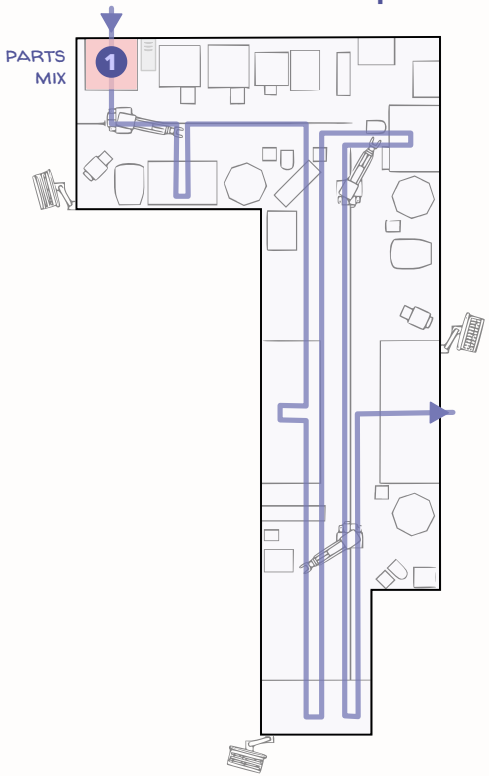

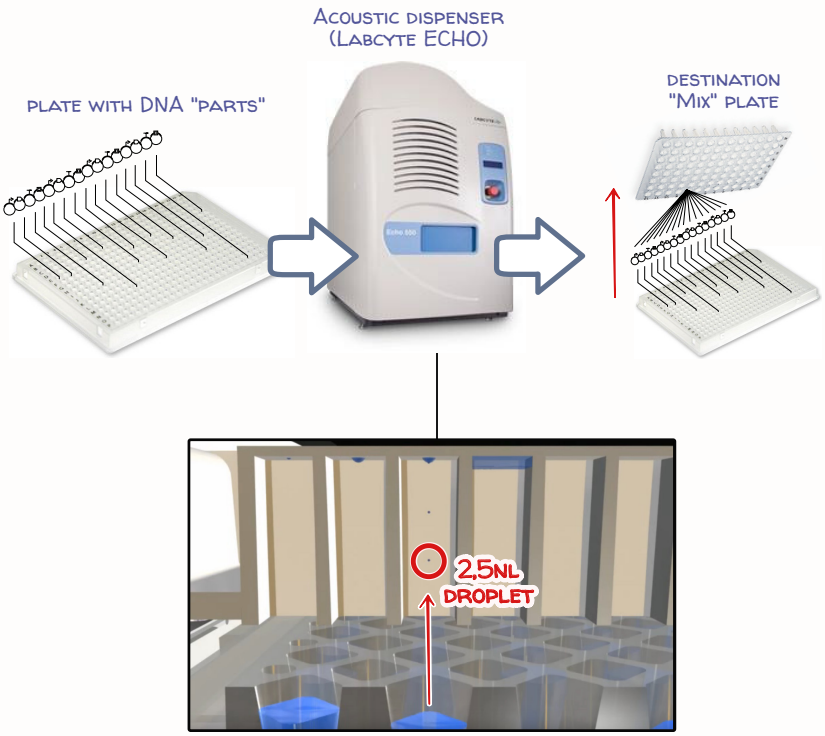

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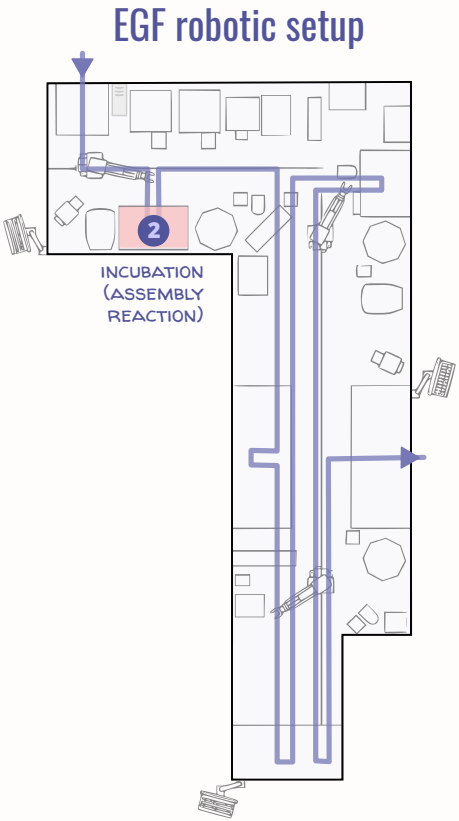

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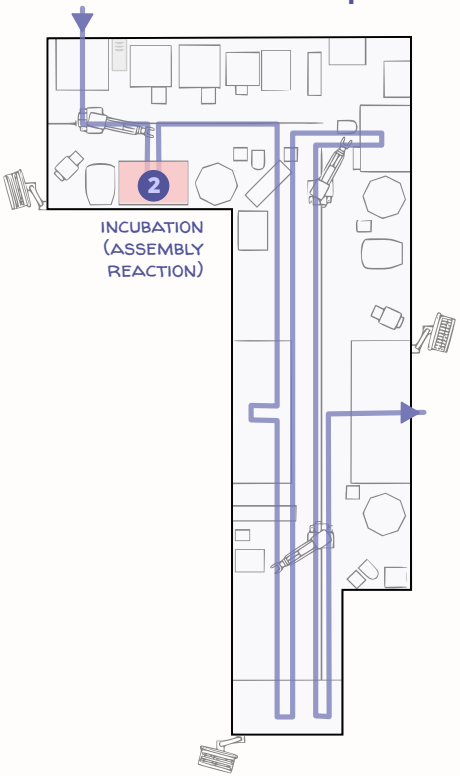

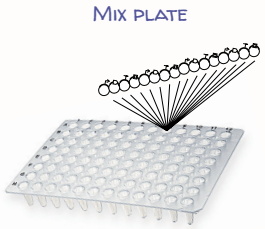

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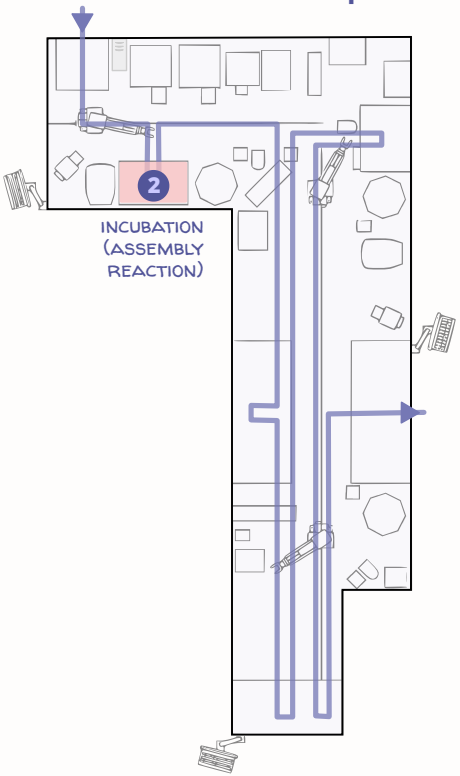

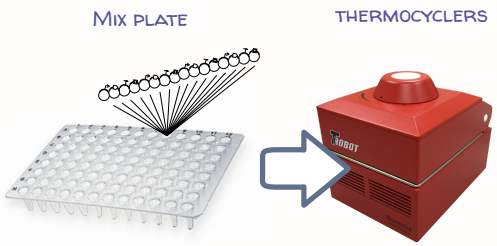

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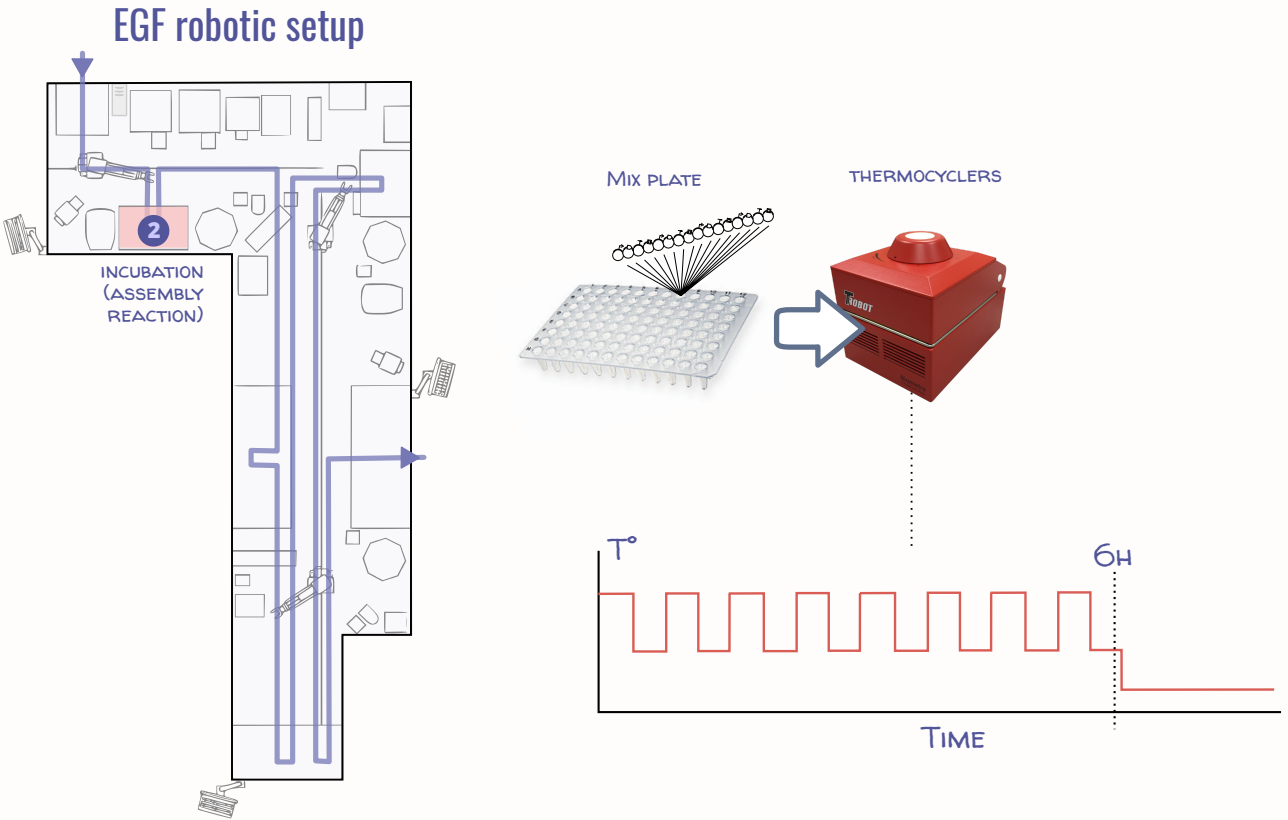

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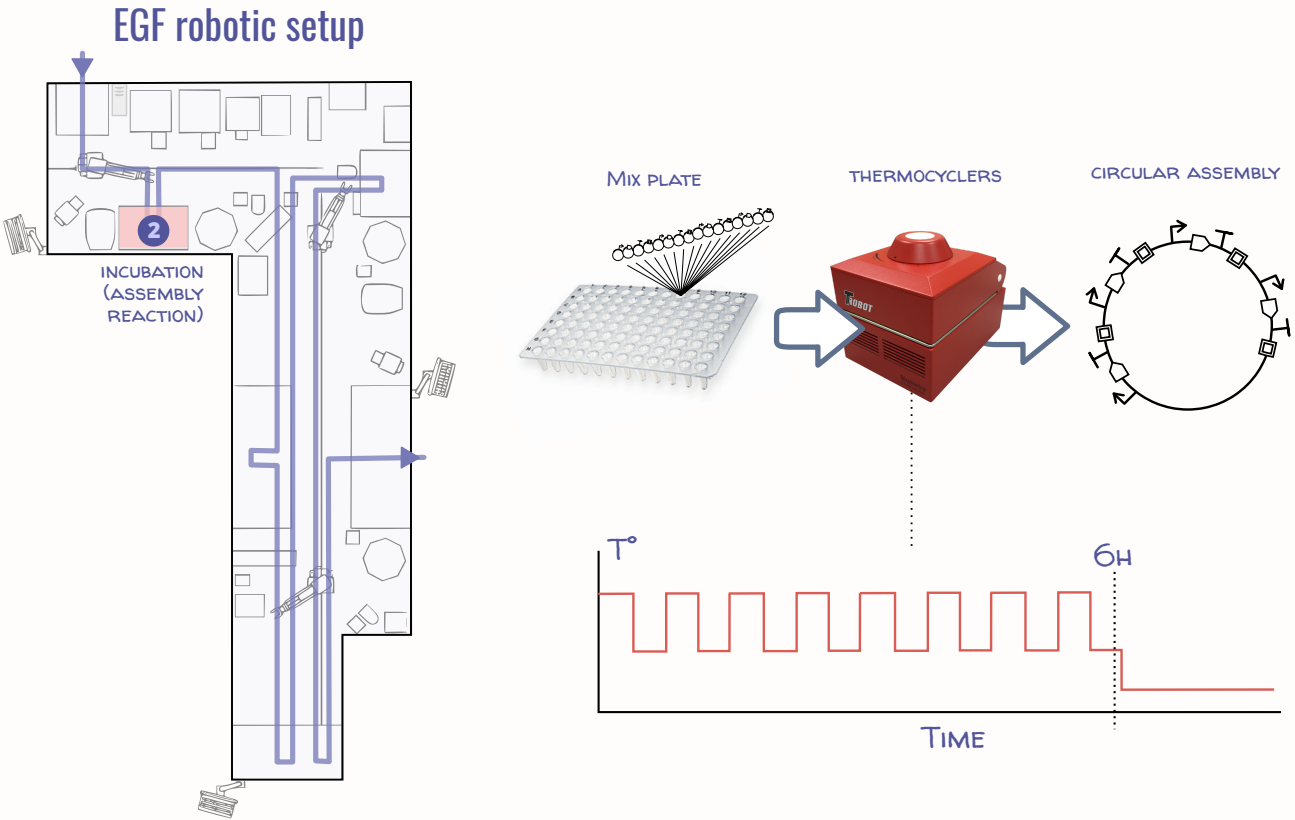

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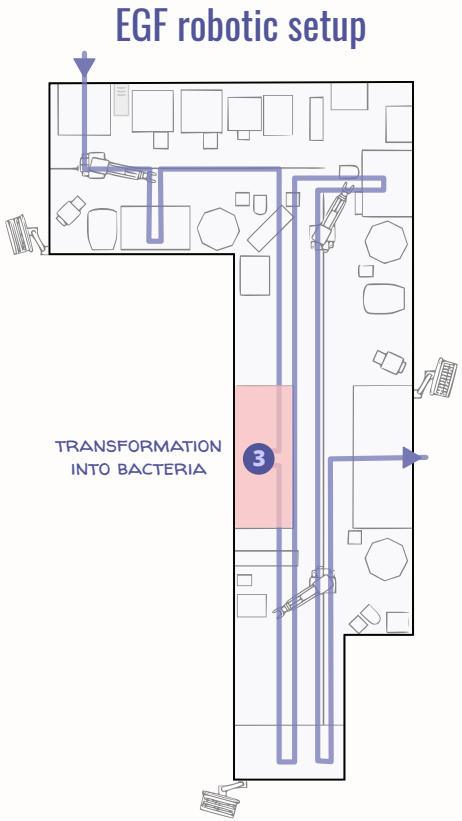

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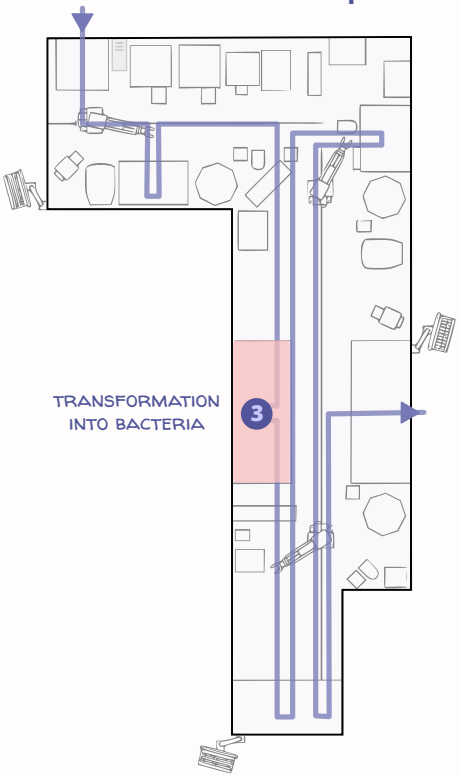

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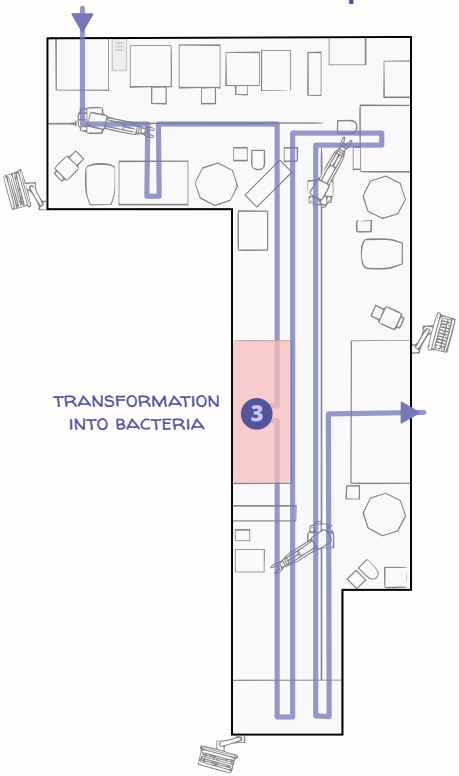
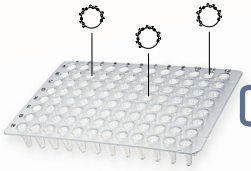
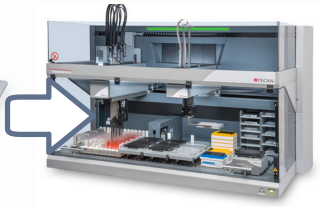


MIX PLATE WITH
CIRCULAR ASSEMBLIES

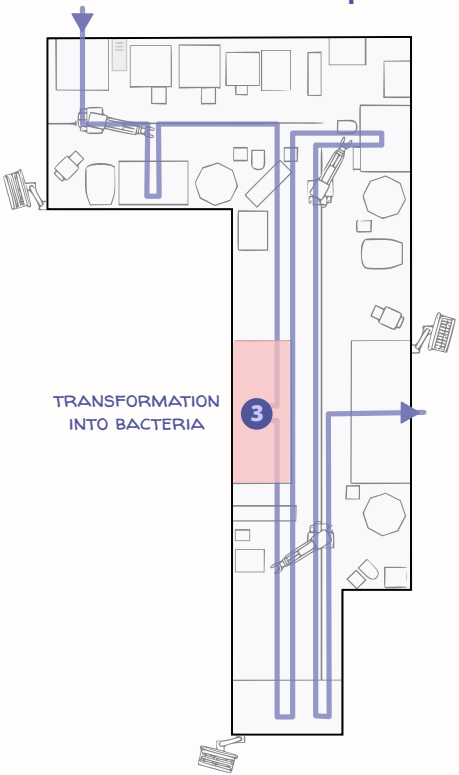


LIQUID HANDLER

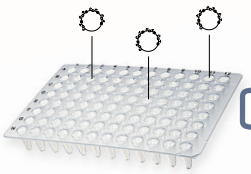


The EGF's High-Throughput Robotic Platform

EGF robotic setup



MIX PLATE WITH CIRCULAR ASSEMBLIES



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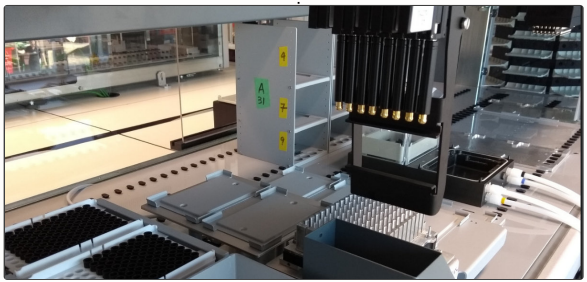

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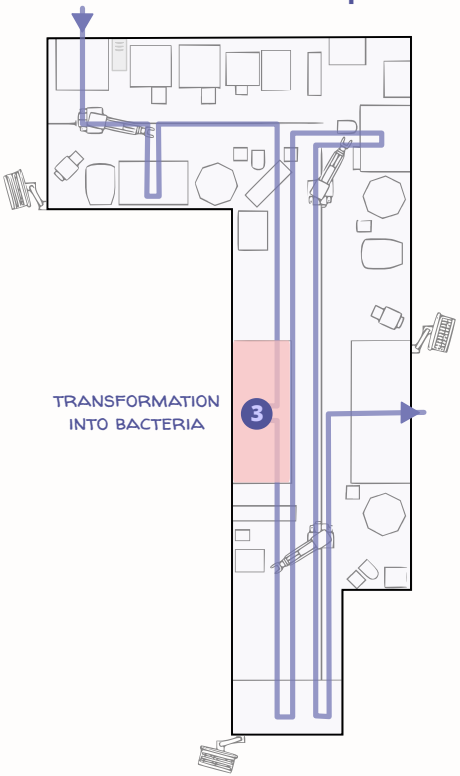

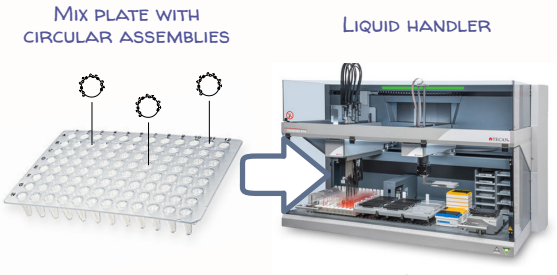

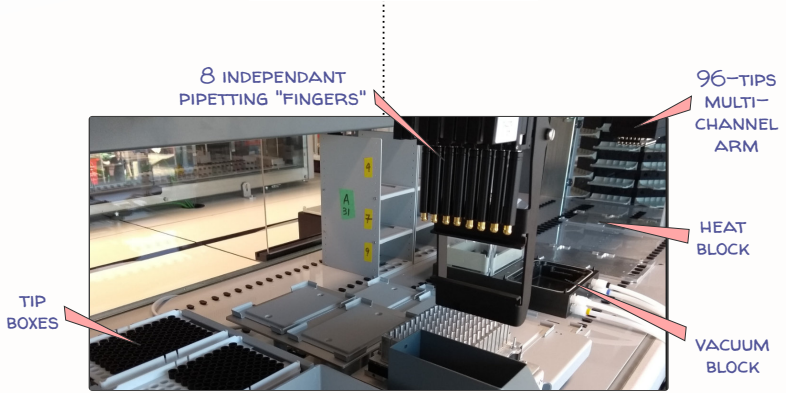

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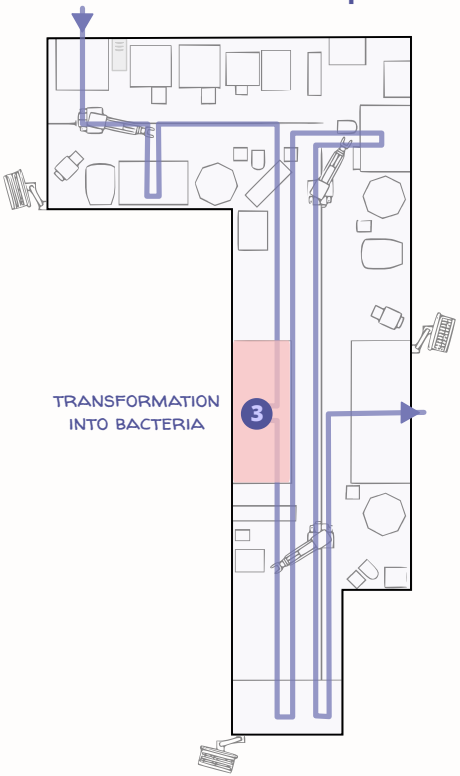
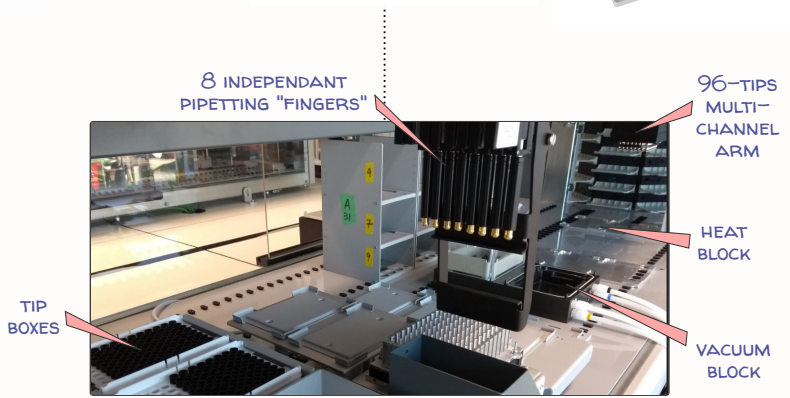
EGF robotic setup





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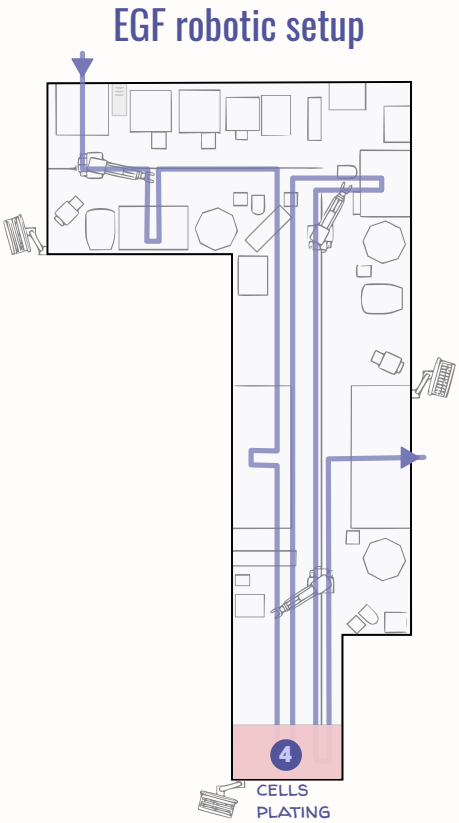

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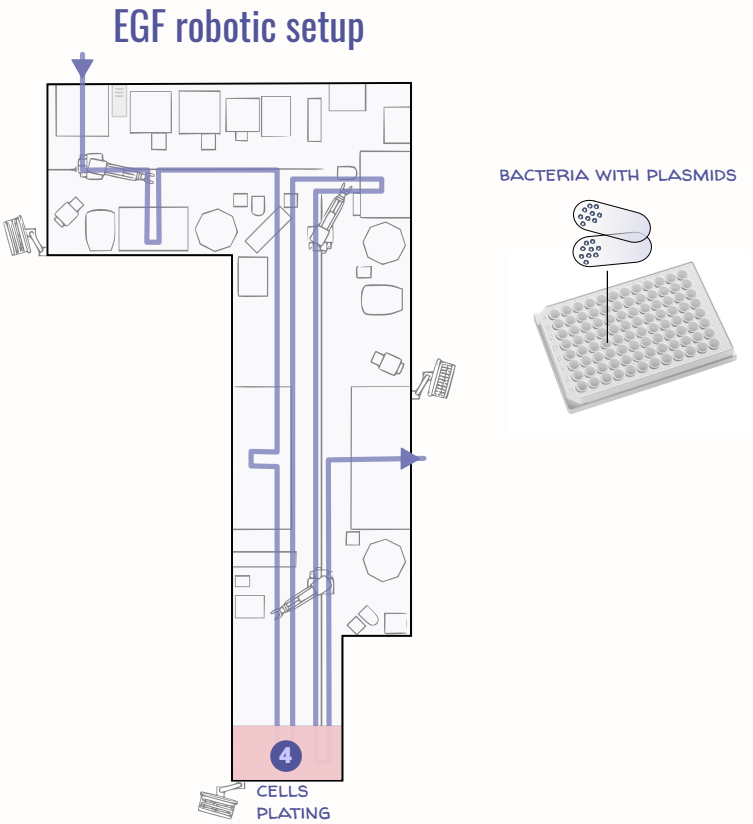
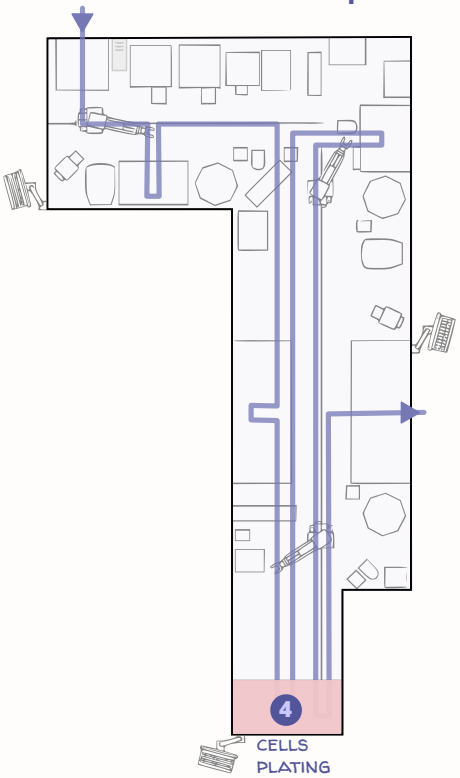
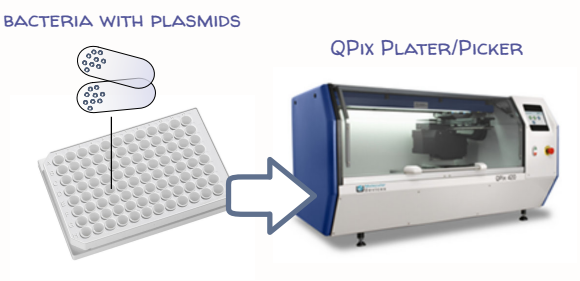


The EGF's High-Throughput Robotic Platform

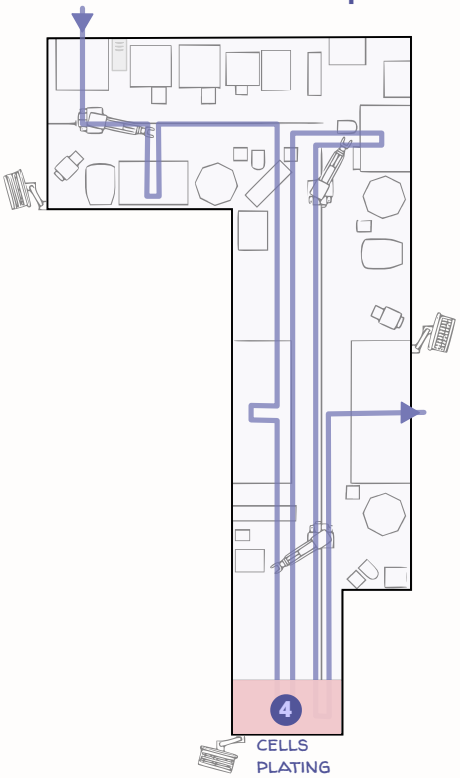
EGF robotic setup

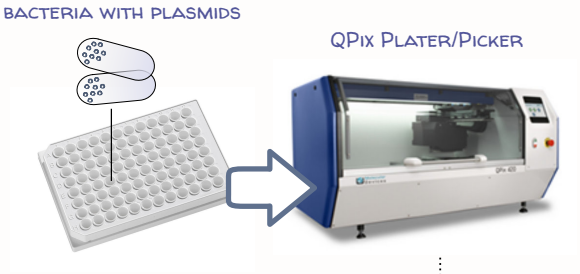


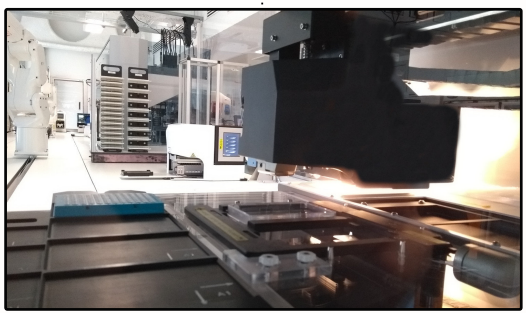


The EGF's High-Throughput Robotic Platform

EGF robotic setup







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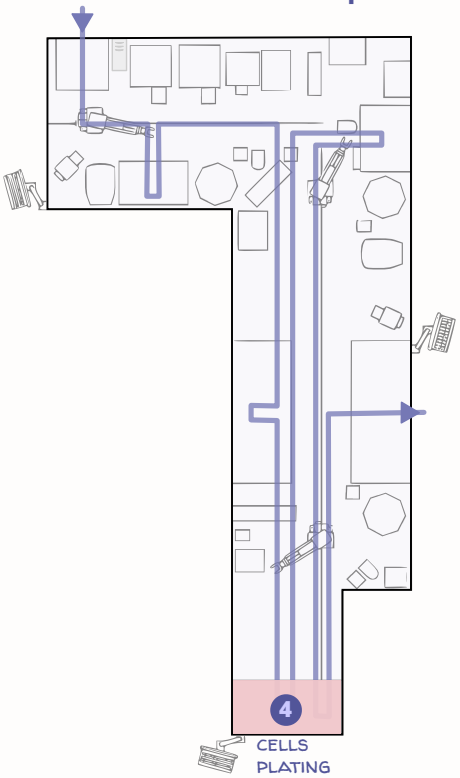
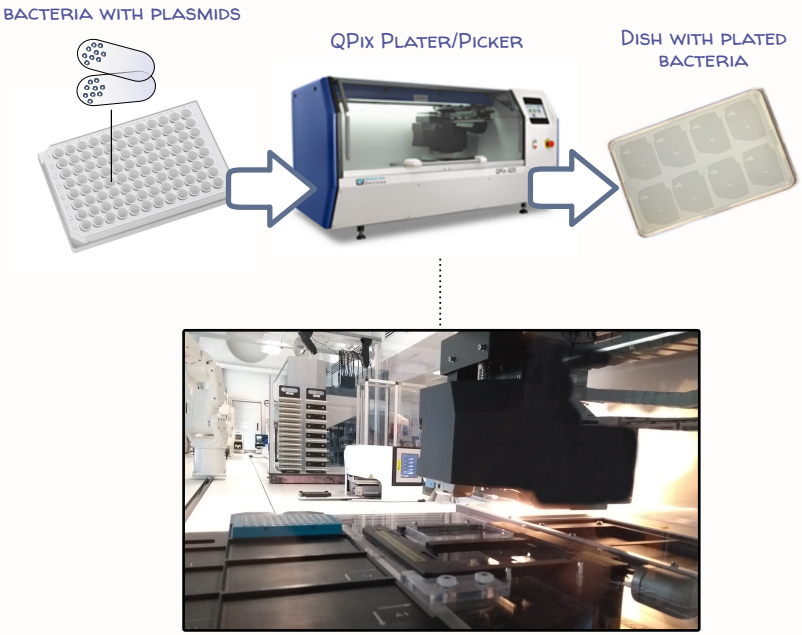
EGF robotic setup





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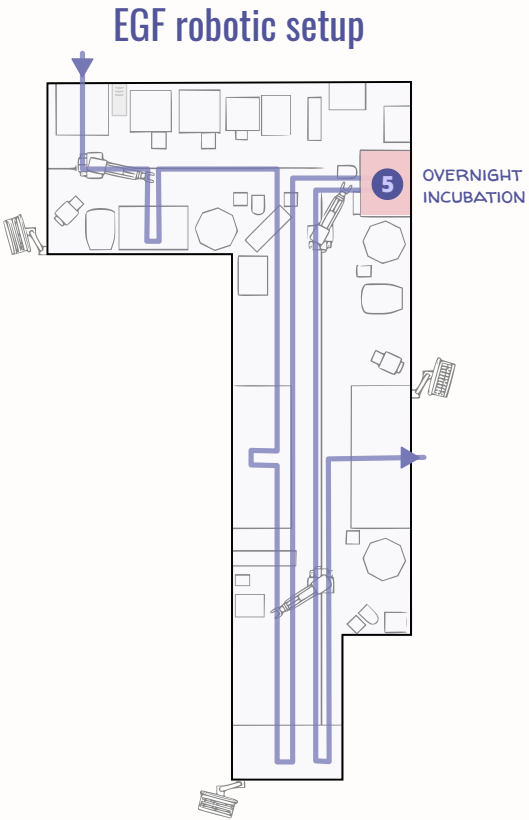

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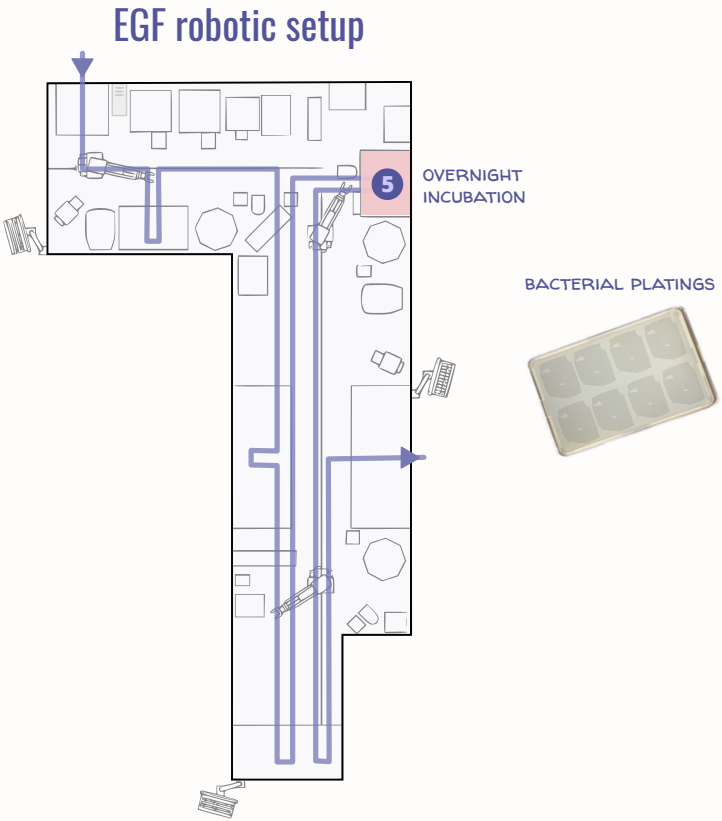

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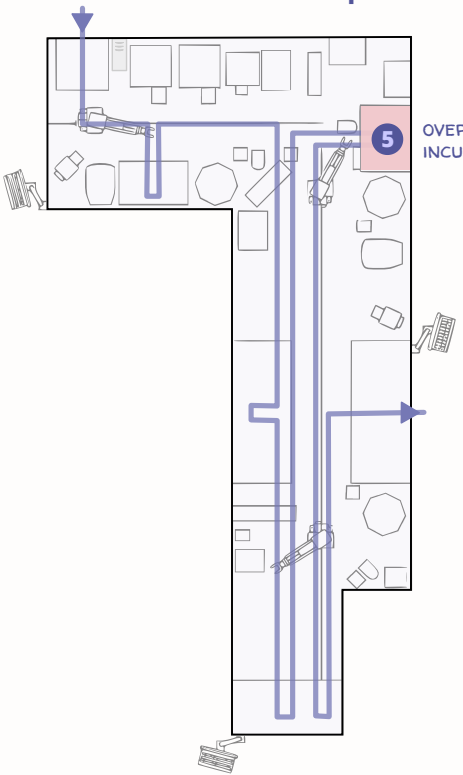
EGF robotic setup



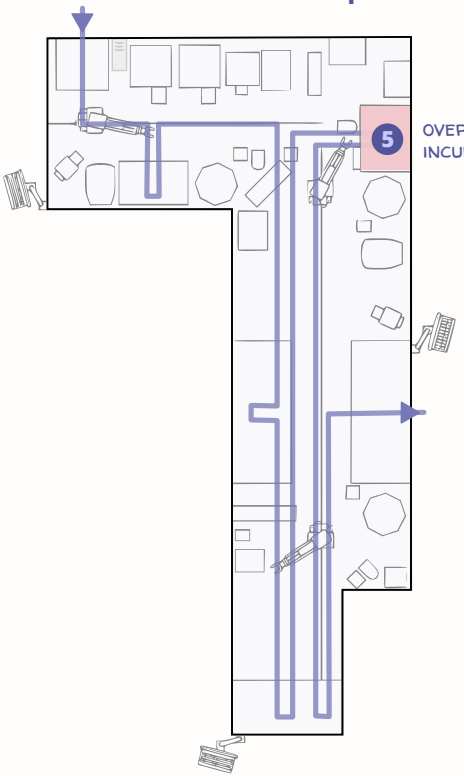
BACTERIAL PLATINGS

INCUBATOR (CYTOMAT)

16H, 37C

The EGF's High-Throughput Robotic Platform

EGF robotic setup



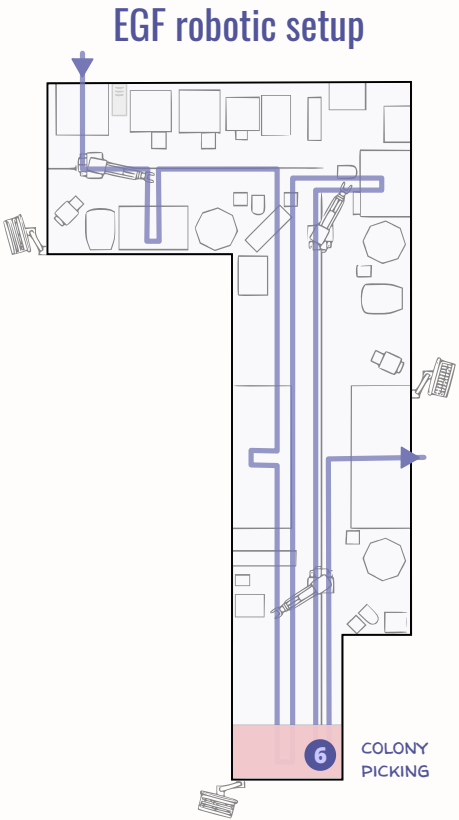
BACTERIAL PLATINGS

INCUBATOR (CYTOMAT)

16H, 37C

BACTERIAL COLONIES

The EGF's High-Throughput Robotic Platform



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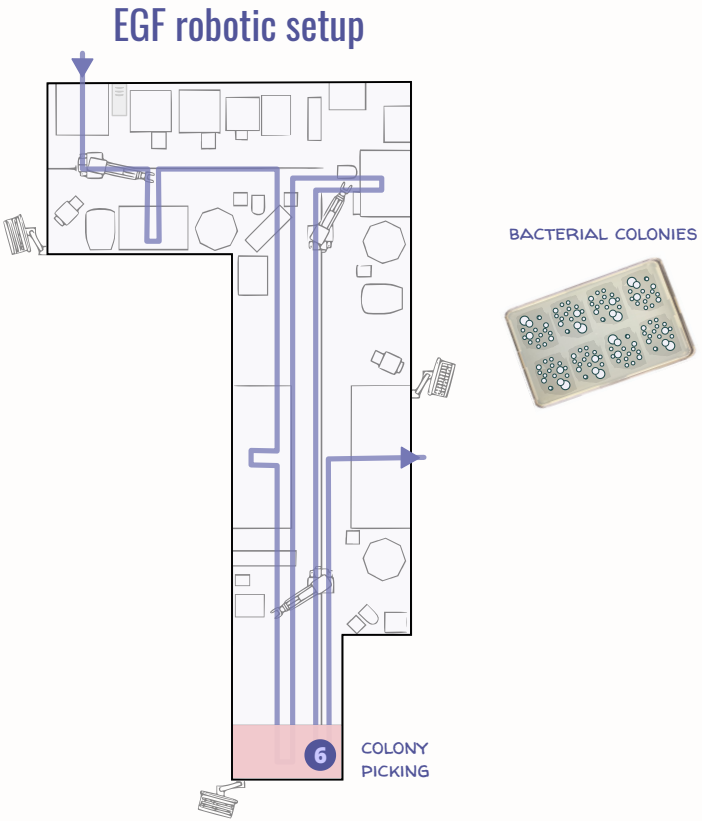

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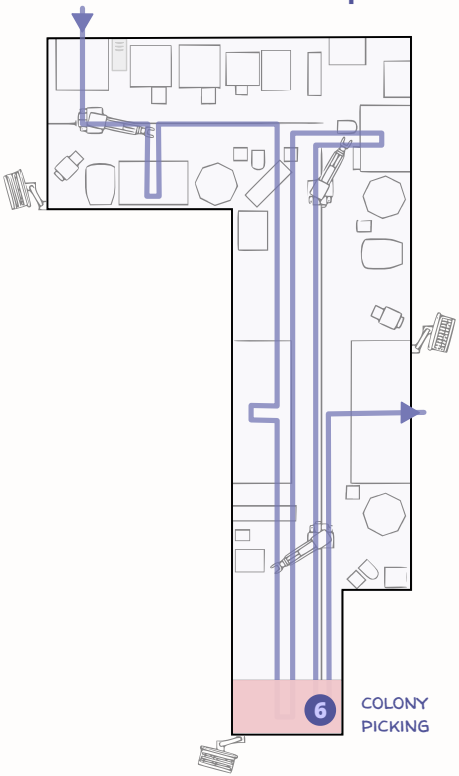
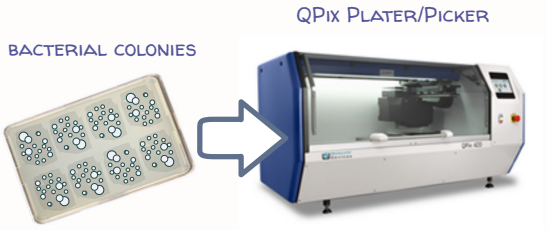
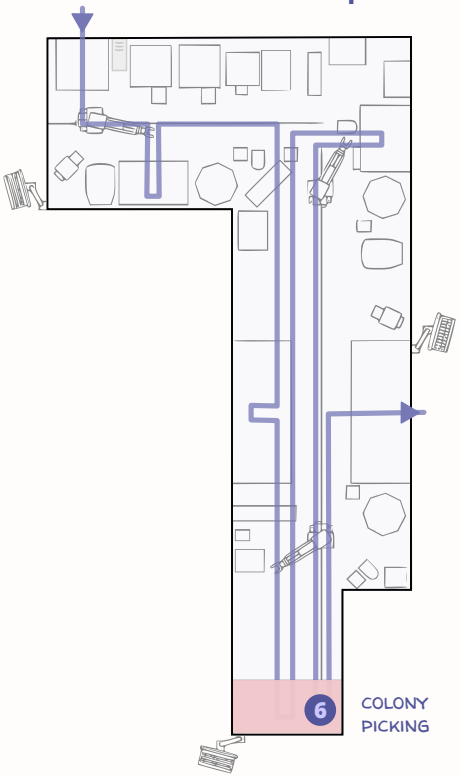
EGF robotic setup





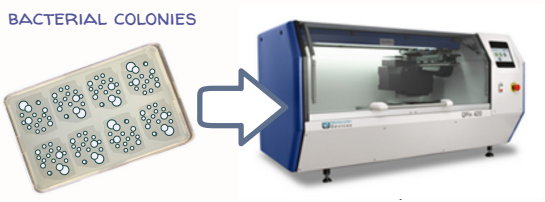
The EGF's High-Throughput Robotic Platform

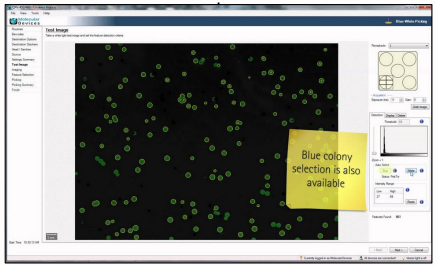
EGF robotic setup



BACTERIAL COLONIES

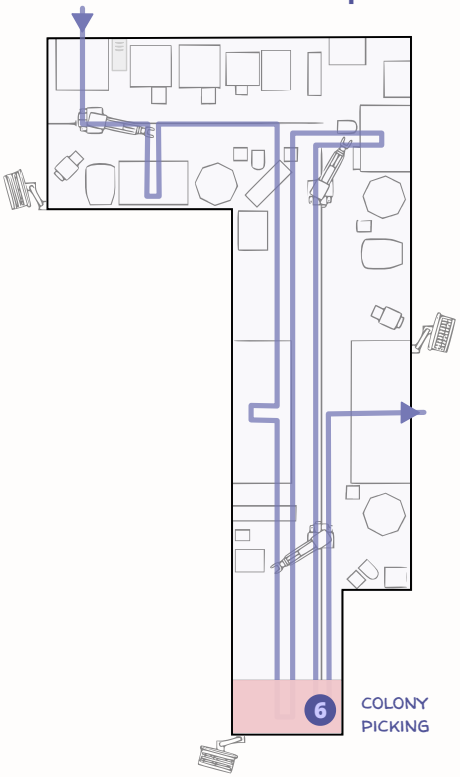
QPIX PLATER/PICKER

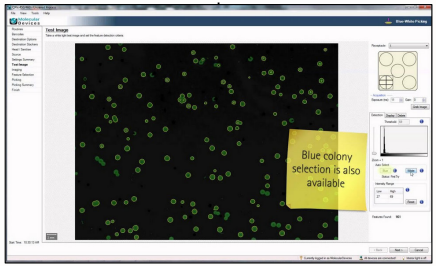




The EGF's High-Throughput Robotic Platform

EGF robotic setup





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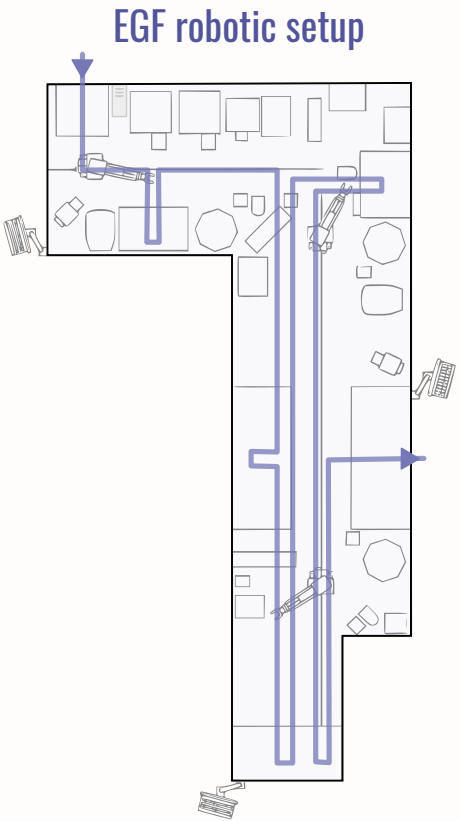
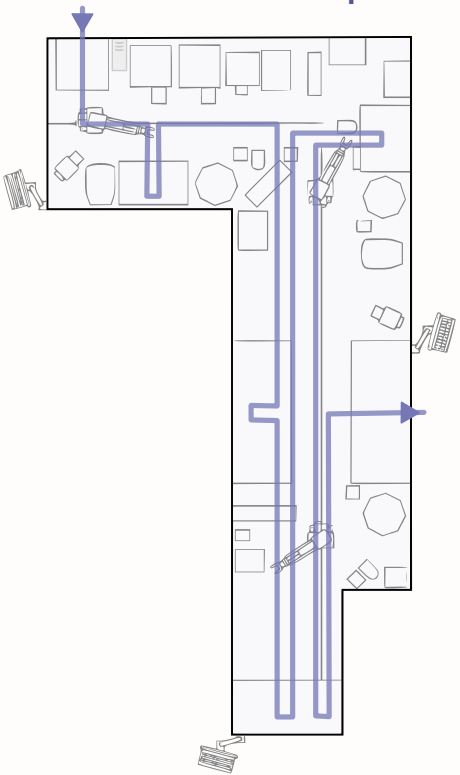


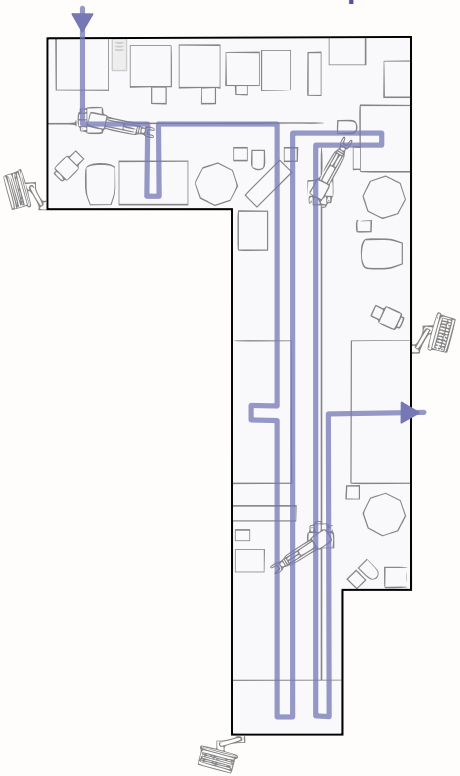
The EGF's High-Throughput Robotic Platform

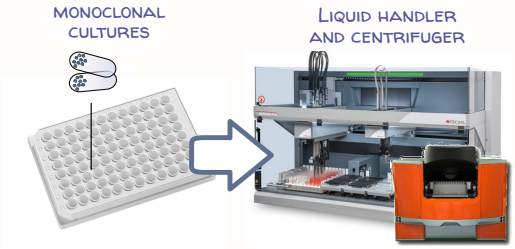
EGF robotic setup



The EGF's High-Throughput Robotic Platform

EGF robotic setup





The EGF's High-Throughput Robotic Platform

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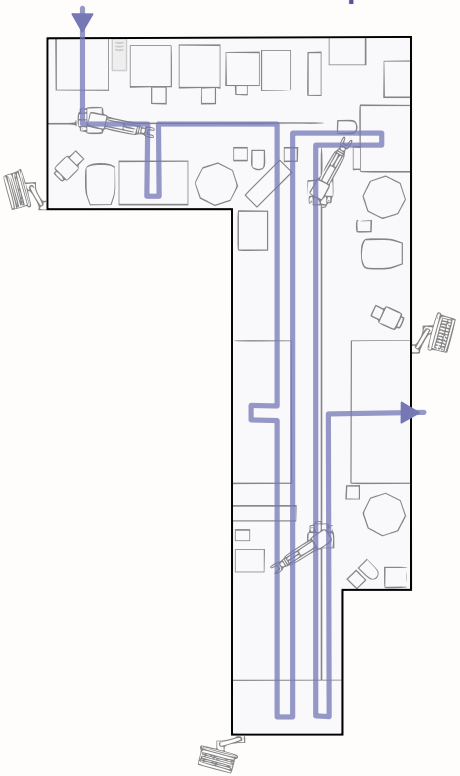

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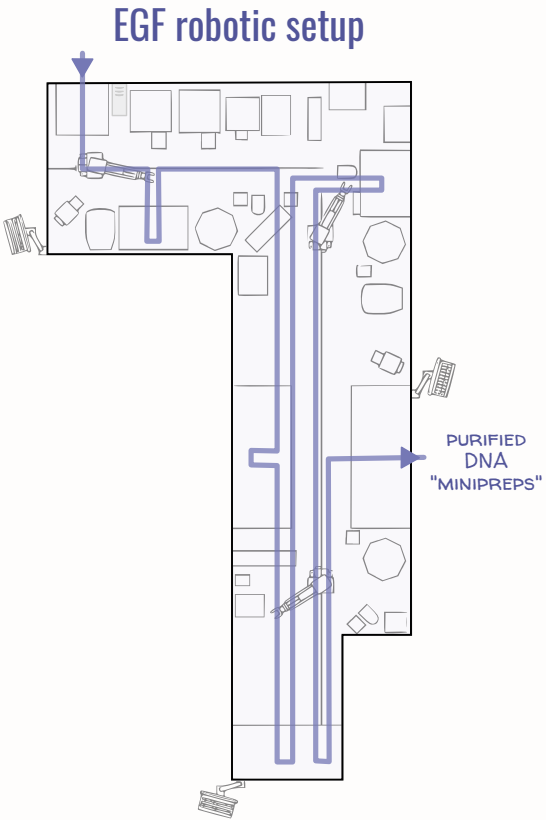

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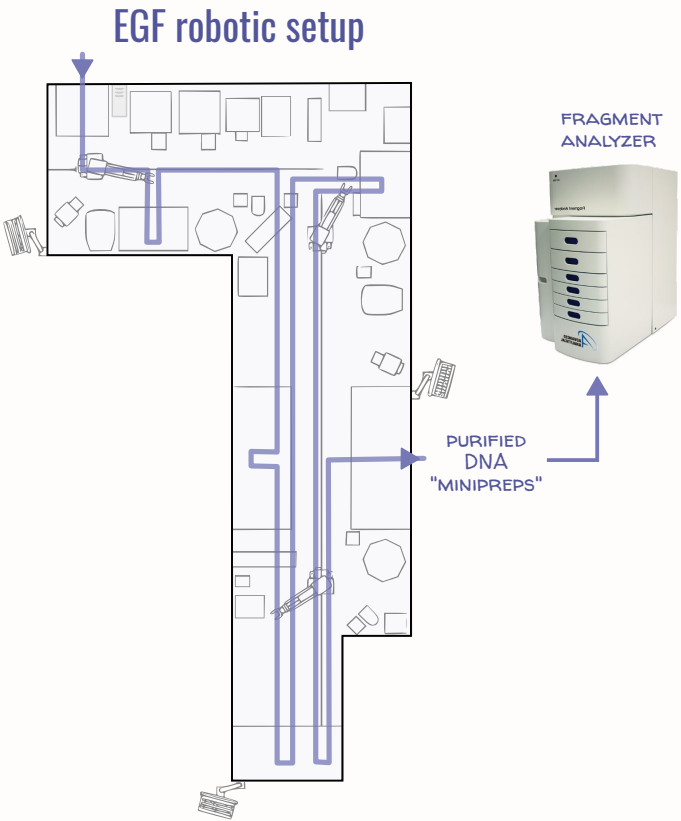

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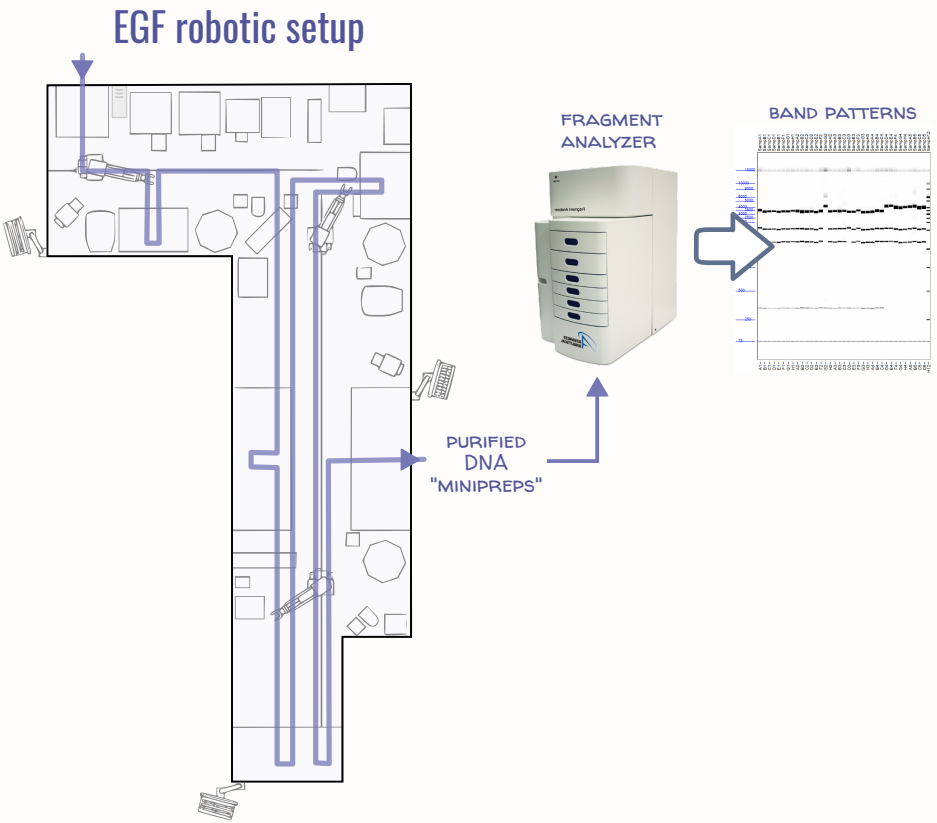
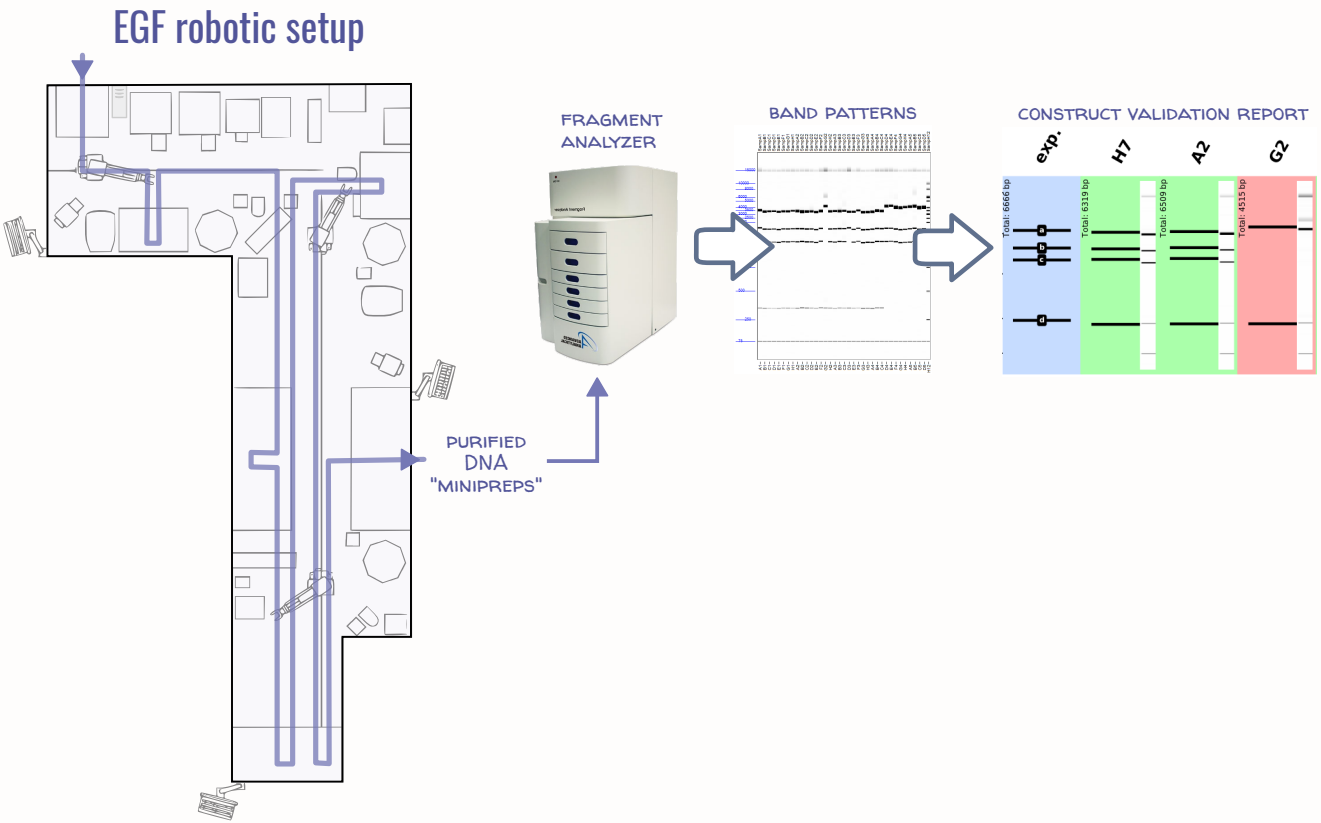


The EGF's High-Throughput Robotic Platform



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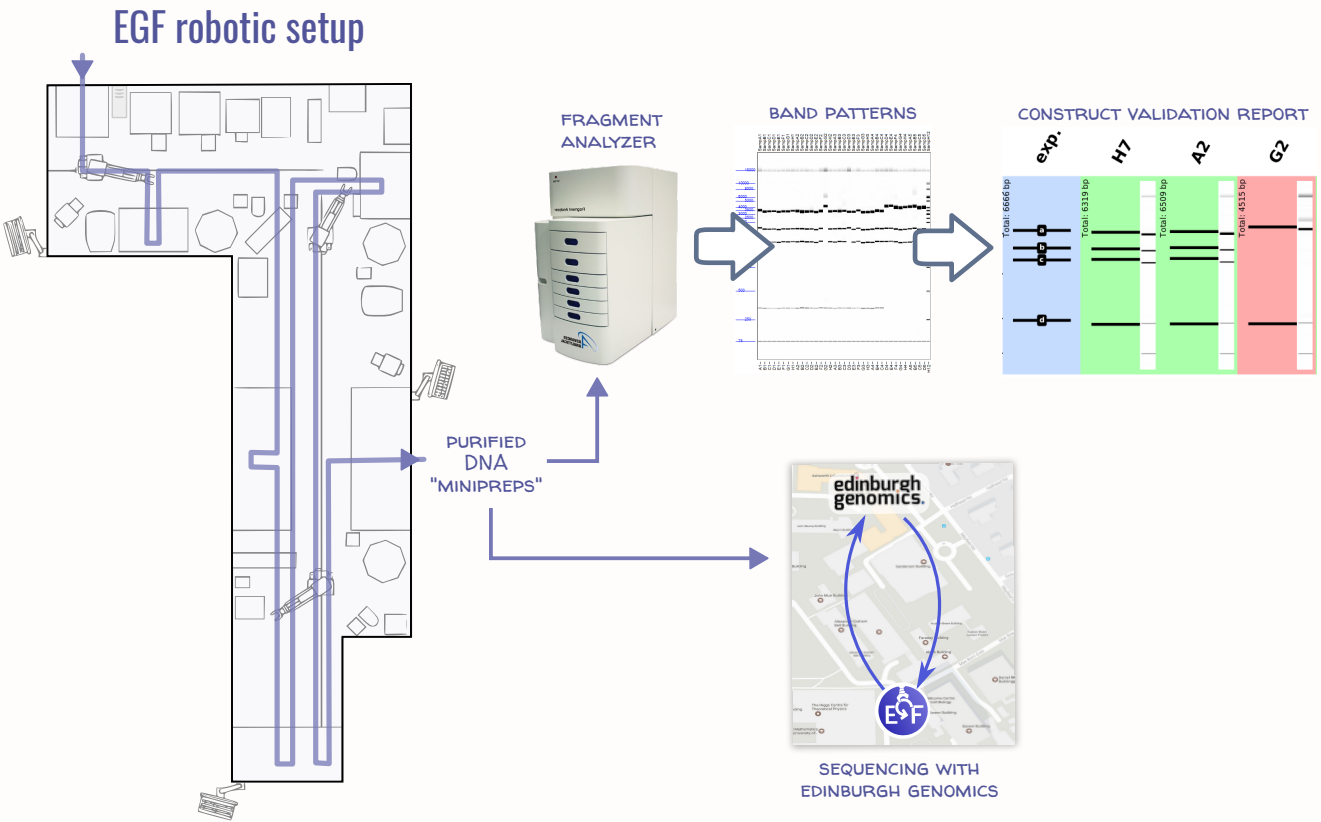

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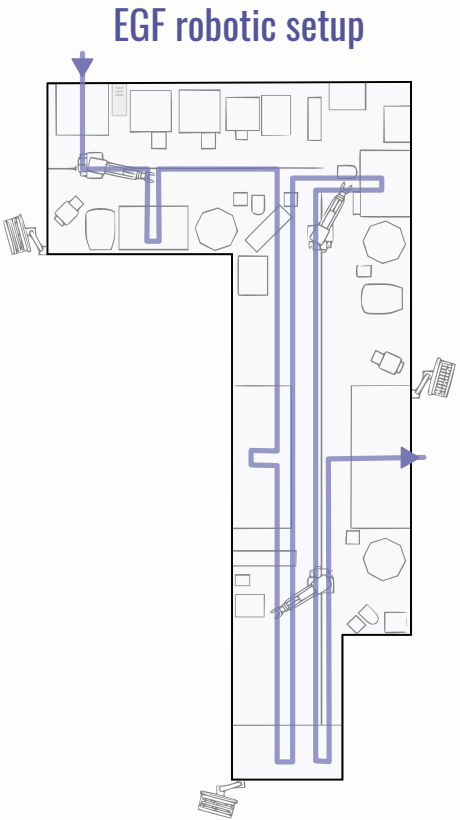
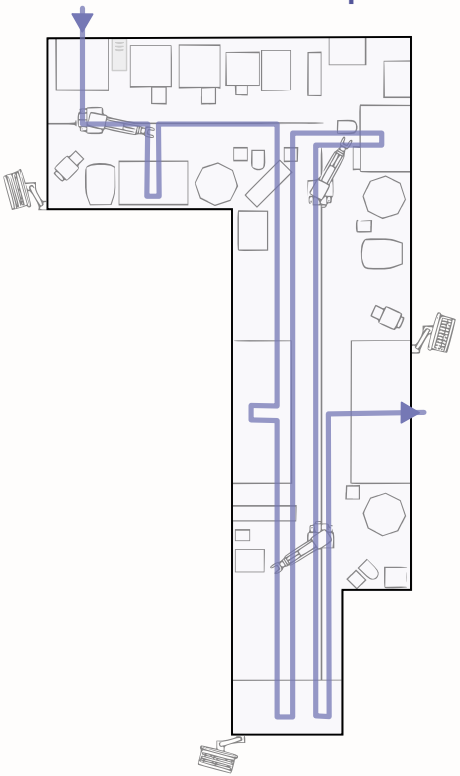
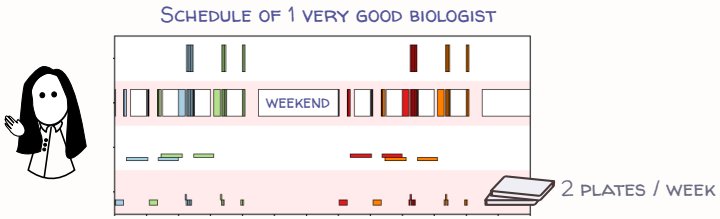


The EGF's High-Throughput Robotic Platform

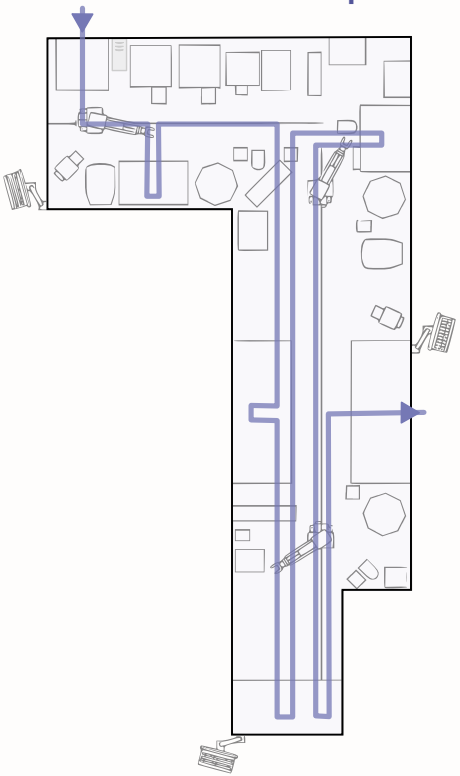
EGF robotic setup



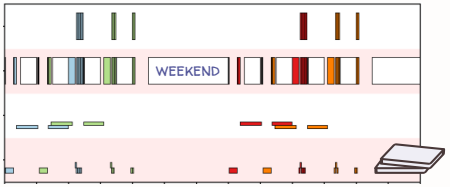


The EGF's High-Throughput Robotic Platform

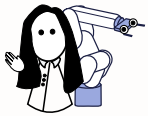
EGF robotic setup



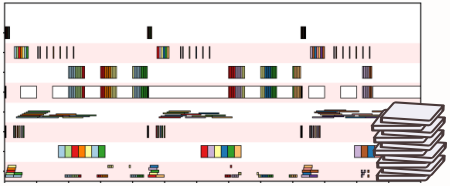
Schedule of 1 very good biologist



2 plates / week



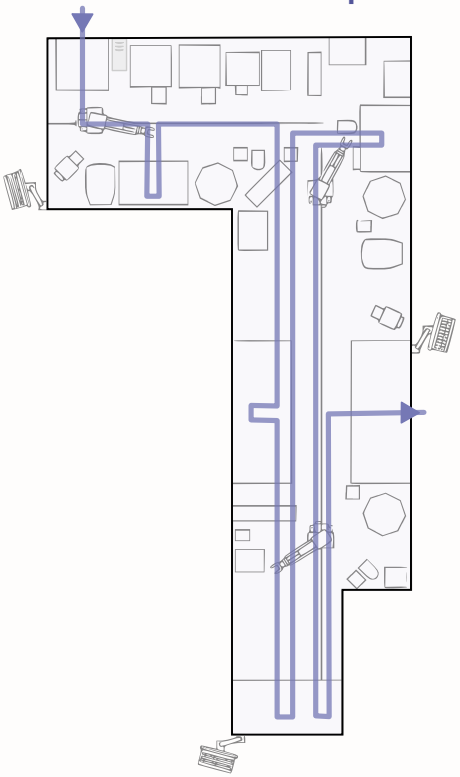
Ideal EGF schedule (biologist + robots)



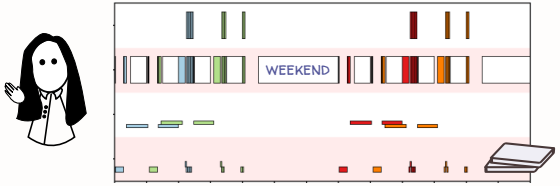
10 plates / week

The EGF's High-Throughput Robotic Platform

EGF robotic setup

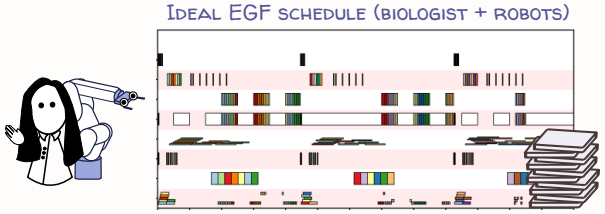


Schedule of 1 very good biologist



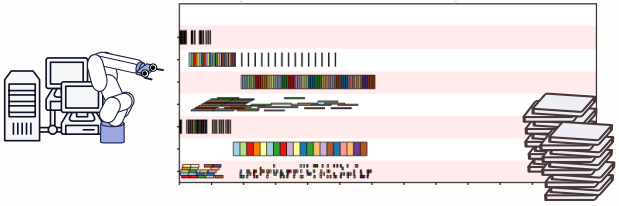
2 plates / week

Ideal EGF schedule (biologist + robots)



10 plates / week

Ideal schedule under full automation



20+ plates / week

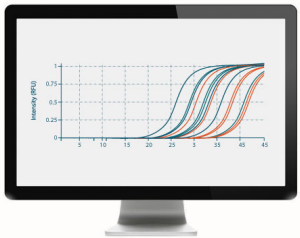
Phenotyping at the EGF

Phenotyping at the EGF

Real-time PCR

Roche Lightcycler

FLUORESCENCE CHARTS



Phenotyping at the EGF

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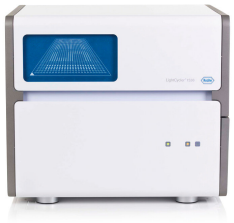
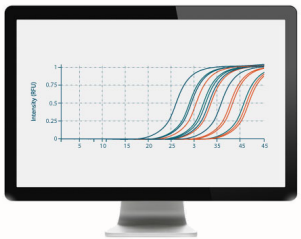


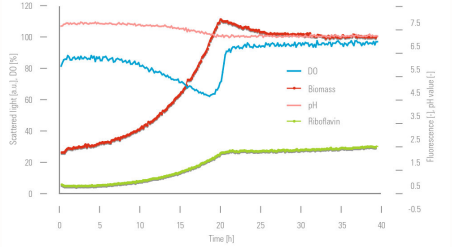
Controled fermenter

MP2Labs Robolector

FLUORESCENCE CHARTS



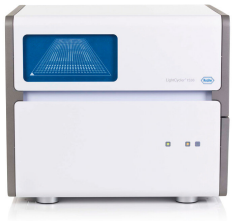
CONTROLABLE PH, DO (OXYGEN), BIOMASS, FLUORESCENCE EXPERIMENTS



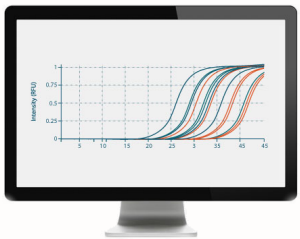
Phenotyping at the EGF

Real-time PCR

Roche Lightcycler



FLUORESCENCE CHARTS



Controled fermenter

MP2Labs Robolector

CONTROLABLE PH, DO (OXYGEN), BIOMASS, FLUORESCENCE EXPERIMENTS

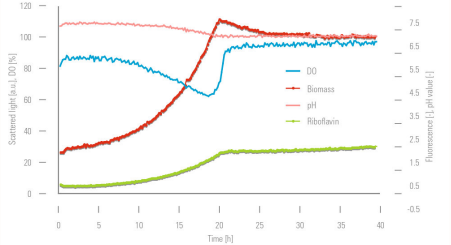
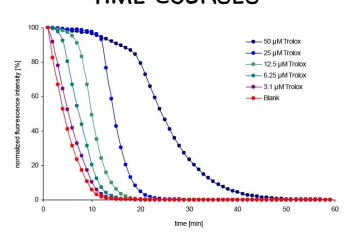


Plate readers

Roche Lightcycler

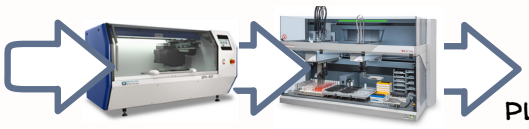
OD, FLUORESCENCE TIME COURSES



Other possible workflows

Other possible workflows

COLONIES FROM COMBINATORIAL CLONING



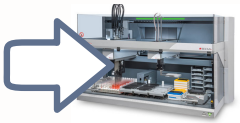
10,000 MOCLONAL PLASMID MINIPREPS

Other possible workflows

COLONIES FROM COMBINATORIAL CLONING

10,000 MOCLONAL PLASMID MINIPREPS

CELL CULTURES



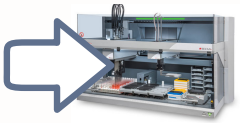
mRNA EXTRACTS

Other possible workflows

COLONIES FROM COMBINATORIAL CLONING

10,000 MOCLONAL PLASMID MINIPREPS

CELL CULTURES



mRNA EXTRACTS

cDNA, PRIMERS, REAGENTS

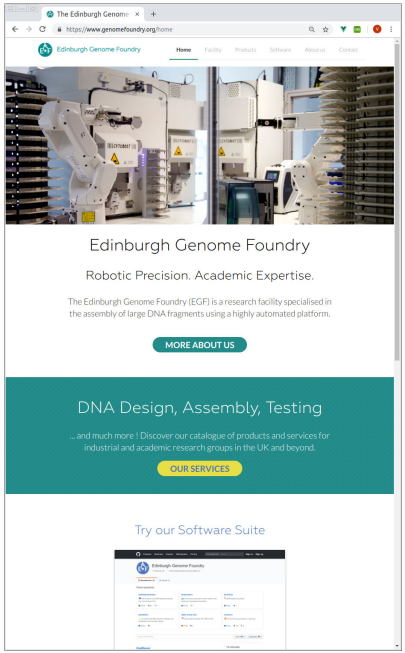
qPCR DATA

The EGF on the Web

The EGF on the Web

EGF Website (products/contact)

genomefoundry.org



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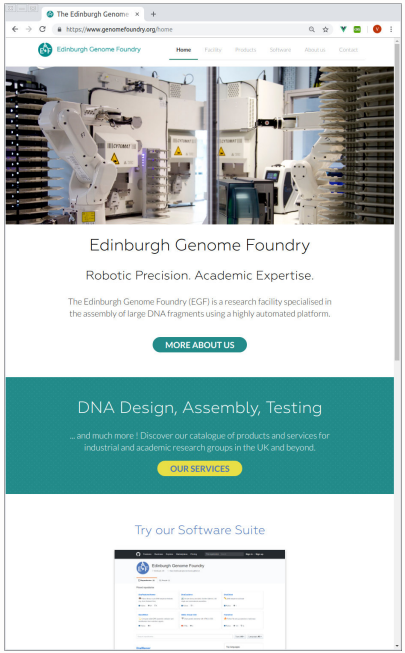
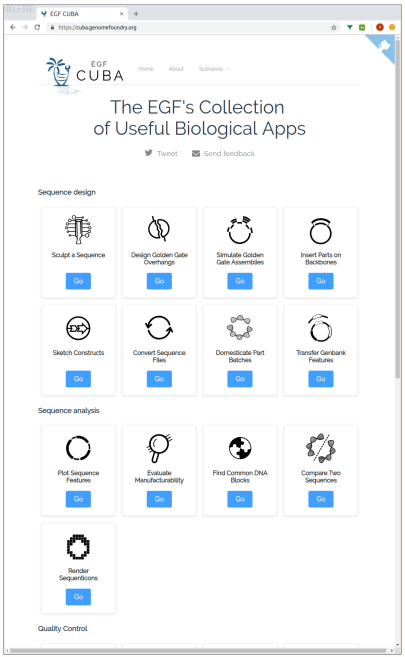


Public web apps for biologists
cuba.genomefoundry.org



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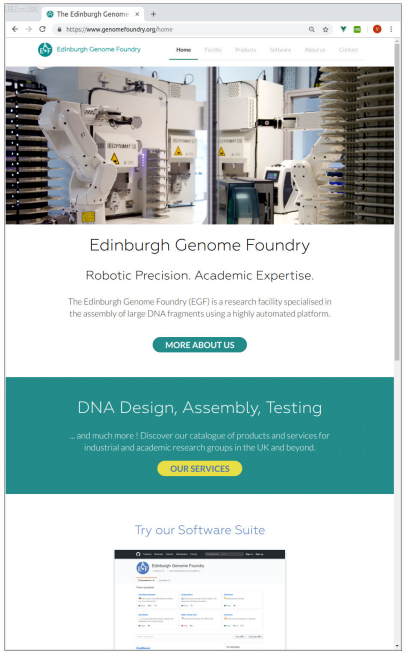

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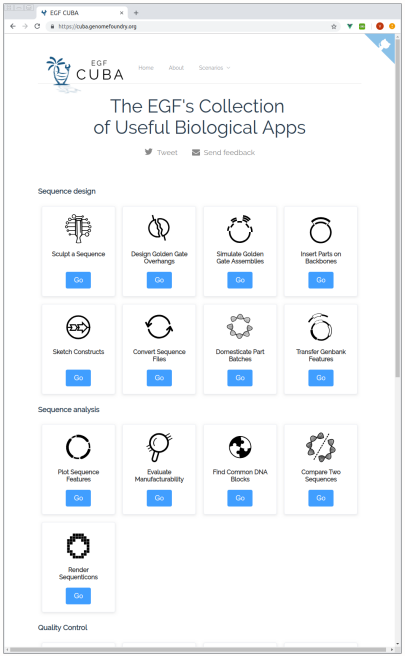
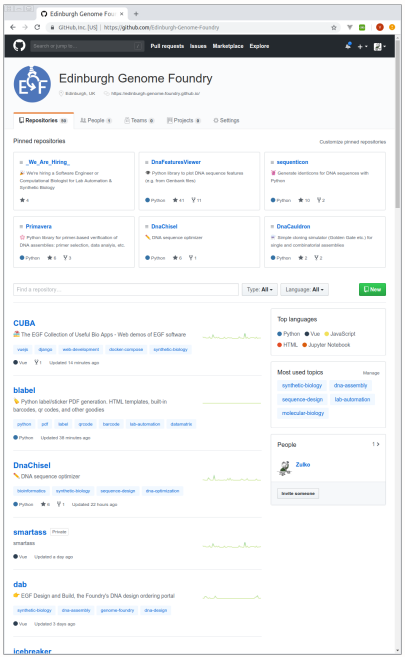


Github repos (80% MIT)
@Edinburgh-Genome-Foundry



Thanks from the team!

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