

Synthetic Biology

A prescriptive approach to biology

With **Tom Ellis** - CSynBI, Imperial College London

For more information visit: www.nhm.ac.uk/naturelive

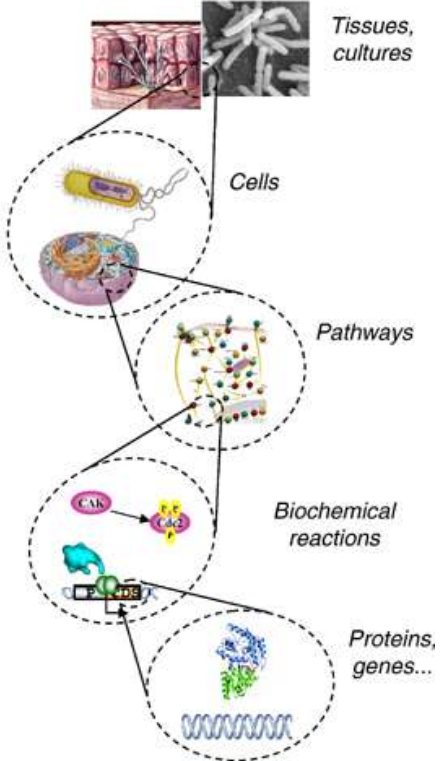
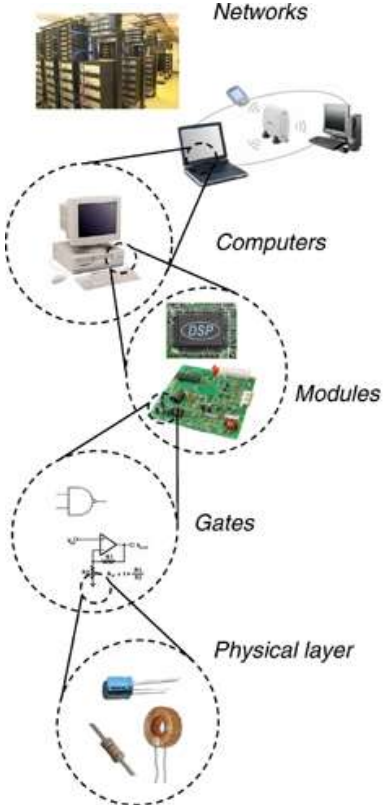
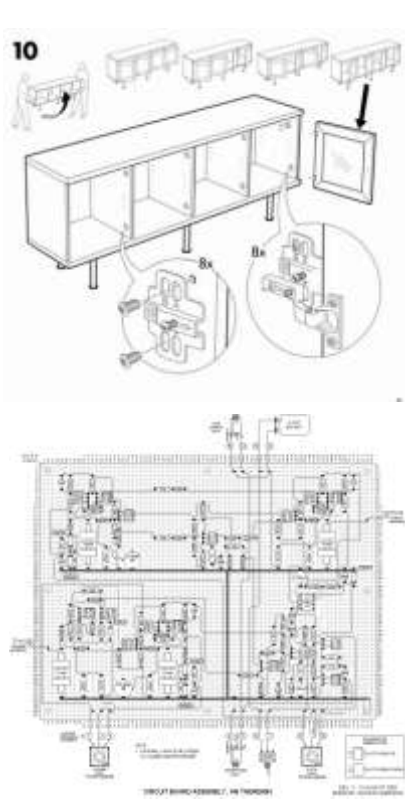


What is Synthetic Biology?

Synthetic biology is the **engineering** of biology: the synthesis of complex, biologically based (or inspired) systems which display functions that do not exist in nature.

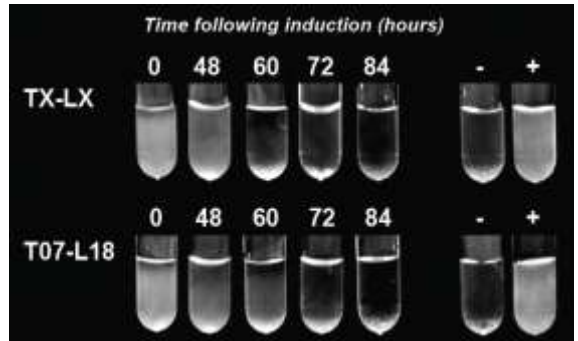
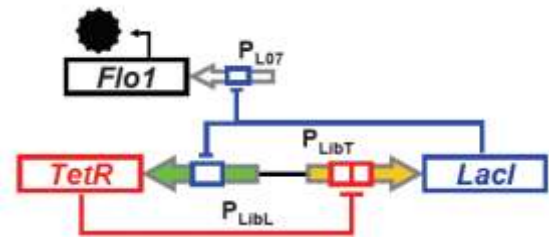
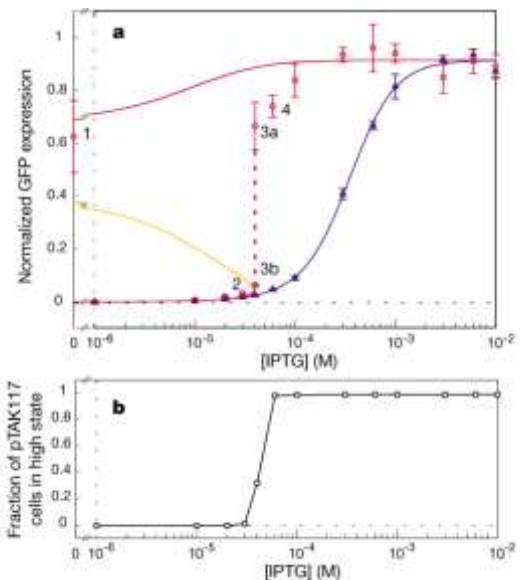
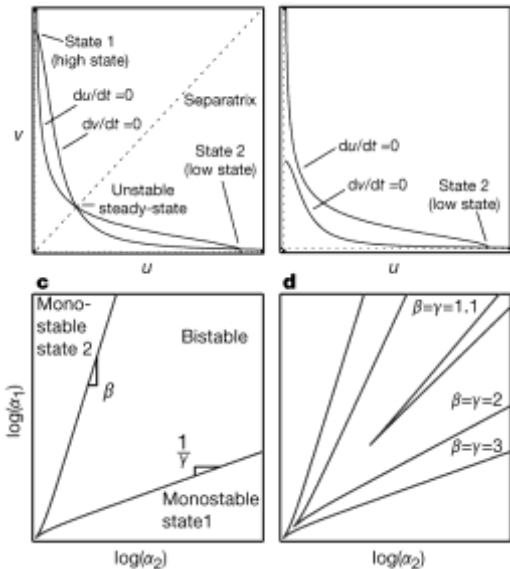
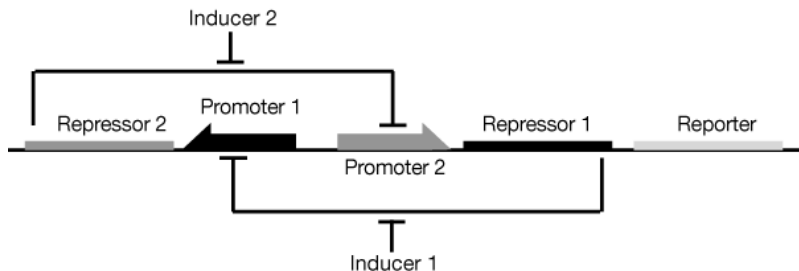
Source: High-level Expert Group European Commission

Engineering Biology – Parts, Devices & Systems



Example: A Genetic Toggle Switch

TS Gardner, CR Cantor and JJ Collins (2000)
 A predictable, modular genetic unit for heritable memory – “an applet”



Usable Parts for Biotechnology

Registry of Standard Biological Parts

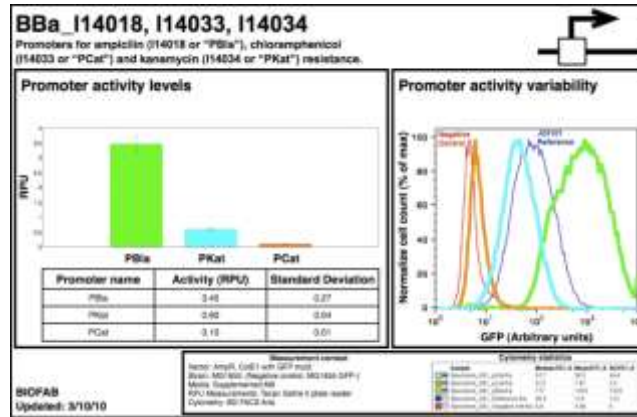
Promoters/Catalog/Ecoli/Positive

All the promoters on this page are ± 200 bp proximal flanking an arbitrarily registered promoter for standard base of at least one nucleotide from either the top (right) or bottom (left) will increase the activity of base promoter.

Positively regulated E. coli σ^{70} promoters

This section lists promoters that are recognized by E. coli σ^{70} RPO σ^{70} as the major σ factor and regulation of these should be RPO σ^{70} genes to describe these promoters under near growth conditions (although normally during exponential growth).

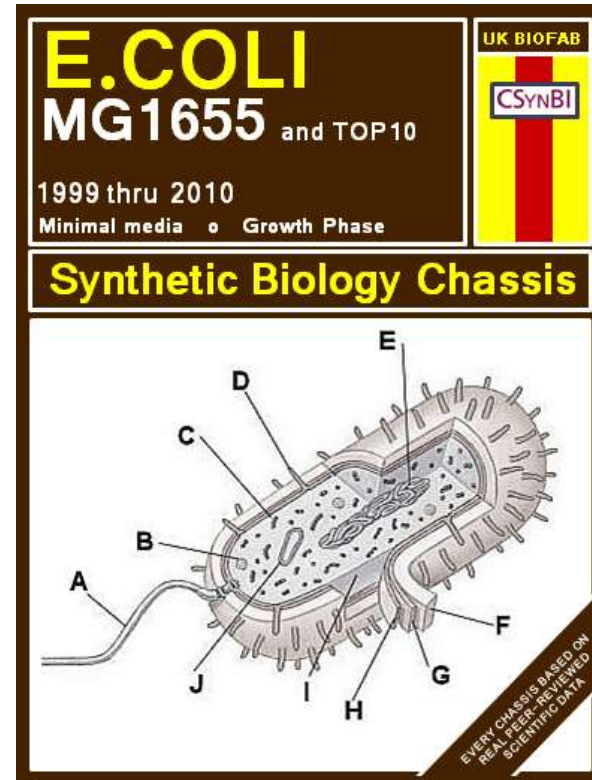
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BBa_114019	10x Lac	10x Lac
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BBa_114021	10x Tet	10x Tet
BBa_114022	10x Lac	10x Lac
BBa_114023	10x Gal	10x Gal
BBa_114024	10x Tet	10x Tet
BBa_114025	10x Lac	10x Lac
BBa_114026	10x Gal	10x Gal
BBa_114027	10x Tet	10x Tet
BBa_114028	10x Lac	10x Lac
BBa_114029	10x Gal	10x Gal
BBa_114030	10x Tet	10x Tet
BBa_114031	10x Lac	10x Lac
BBa_114032	10x Gal	10x Gal
BBa_114033	10x Tet	10x Tet
BBa_114034	10x Lac	10x Lac
BBa_114035	10x Gal	10x Gal
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BBa_114040	10x Lac	10x Lac
BBa_114041	10x Gal	10x Gal
BBa_114042	10x Tet	10x Tet
BBa_114043	10x Lac	10x Lac
BBa_114044	10x Gal	10x Gal
BBa_114045	10x Tet	10x Tet
BBa_114046	10x Lac	10x Lac
BBa_114047	10x Gal	10x Gal
BBa_114048	10x Tet	10x Tet
BBa_114049	10x Lac	10x Lac
BBa_114050	10x Gal	10x Gal



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Custom Re-engineering of Cells



CSynBI at Imperial College, London

Synthetic Biology is a technology
Engineering for biotechnology

Developing tools (foundational)

- Predictive models / CAD
- New techniques for construction
- Standard measurement of parts
- Description of chassis cells

Utilising the approach (applications)

- Investigating natural process
- Developing biosensors
- Engineering cells to make products



CSYNBI

Centre for **S**ynthetic **B**iology and **I**nnovation

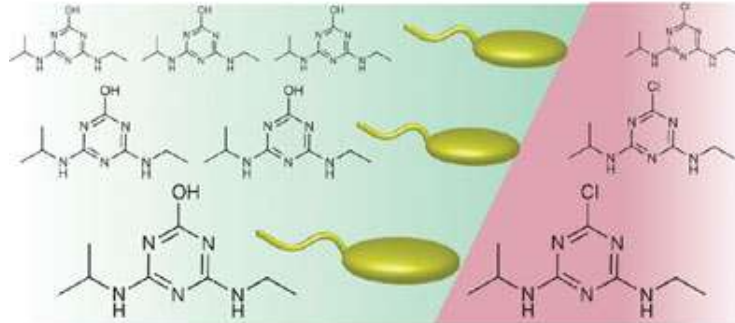
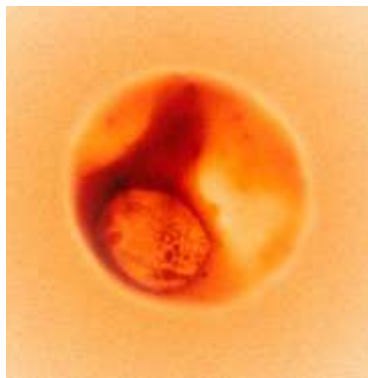
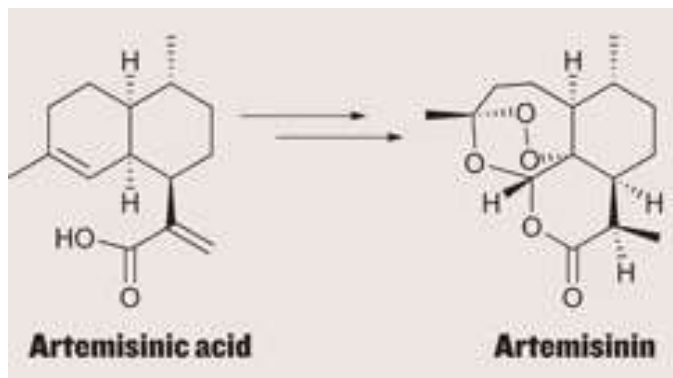
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[Claire Marris](#), [Karen Polizzi](#), [Geoff Baldwin](#)

The Applications of Synthetic Biology



International Genetically Engineered Machines Competition

