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# *PATHFINDER initiative on Synthetic Biology*

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2005





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# Background

- 1st Call 2003, 2nd Call 2004
- 30 proposals received (7 STREPs, 1SSA funded)
- Refinement of reference document for 3rd Call
- Expert Group delivered report (to develop a broader strategy for the area)





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## Issues not covered (1st and 2nd Call)

- Limited number of STREP proposals
- A lot of proposals not regarded as within the scope of the Call
- Lack of ambition in terms of the « technology vision »
- No particular interest in safety issues linked to the topic
- No Coordination Action(s)





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# Why is this topic emerging?

- To understand how cells work you need more than a « list » of parts
- Systems biology provides knowledge how parts of the cell operate together
- New tools available such as computer models and bio-informatics, rapid synthesis, better experimental techniques to explore gene interactions





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# Main vision – Biotechnology that works

- It will drive industry, research, employment, education in a way that might rival the computer industry's development during the 1970s to the 1990s
- Progress will be made much faster and in a much more organized way
- It will enable developments of complex systems not achievable by evolutionary and screening procedures
- If the « engineering of biology » becomes available it will be used for more and more day-to-day applications





# Main directions

- Major change through Synthetic Biology will be achieved by integration of existing disciplines.
  - Biology and engineering, computer modeling, information technology, control theory, chemistry and nanotechnology
- Synthetic Biology is primarily not concerned with investigating how nature works, but is ultimately about a new way of making things.





# Objective/s

- The DESIGN and ENGINEERING of biologically based (or inspired) PARTS or SYSTEMS with:
  - New standardised functionalities NOT present in NATURE
  - High level of internal complexity
  - Logical or complex dynamical behaviour





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# Specific Target Research Projects (STREPs) (1)

- Demonstration of mastering control over key biological processes.
- Development and application of robust modules amenable to standardisation.
- Combination of rigorous engineering methods and high-quality science, involving adequate expertise in core engineering disciplines.







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# Specific Target Research Projects (STREPs) (2)

- Demonstration of real capacity to drive new discoveries and theories  
  
and/or
- Proof of concrete applicability to model areas.





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# Co-ordination Action (CA)

- Co-ordination of existing and future research projects.
- Networking of European activities in relevant fields
- Intellectual and material infrastructure requirements of synthetic biology
- Perspectives and strategies for innovation and industrial translation, including intellectual property
- Societal acceptance, including ethical, safety and regulatory aspects





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## Specific Support Actions (SSAs)

- Tackling practical questions related to the field.
- To assist in the mapping and development of the definition of the field in question.
- Assessing future development prospects and trends in the field.





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# What research will NOT be pursued ?

- Research whose main focus is computational, combinatorial or biomimetic chemistry.
- Research on functional genomics and proteomics.
- Single-component genetic engineering and classical biotechnology, including classical metabolic engineering.
- Research on structural biology and systems biology mainly aimed at the generation of basic knowledge.
- Protein engineering or chemistry in its classical sense.
- Research on tissue engineering.
- Research on artificial organs and bionics implants, and other research on classical biomedical engineering.
- Research related to Artificial Life (as the term is used by the ICT community e.g. life-like machines or computers).

