Objective

"Artificial genetic sequences have become an important tool for the development of new therapeutics but may also define a trait of technological innovation. The possibility to synthesize genes, plasmids and chromosomes combined with the possibilities of directed mutagenesis and genetically reprogramming organisms and directing their evolution will become a crucial issue in synthetic biology. The uniformity of genetic alphabets, the universality of the genetic code, the ubiquity of genetic interchanges and the risks of genetic pollution cannot be overlooked. On the other hand, synthetic nucleic acids will become more and more important as potential new drugs.

It is proposed to develop an additional type of nucleic acids for the use as information system for the propagation of specific information of non-natural origin. It is the aim of the project to contribute to the development of an artificial genetic system orthogonal
to the natural system that can be used as well in synthetic biology as in medicine. Therefore we have to select & develop the appropriate chemical and enzymatic tools. This means (chemically) the selection of unnatural nucleic acids, their precursors and their modification for uptake in bacteria. Specialized polymerases as well as ligases will need to be developed for this purpose. The goal of the project is to design and synthesize a first orthogonal plasmid and new series of aptamers. A first application is the production of new therapeutics. This is a multidisciplinary project involving mainly chemistry and biotechnology. The general project architecture is to explore experimental progress in vivo and in vitro to reach the final assembly of an XNA episome."

**Fields of science**

- -

- - -

**Programme(s)**

**Topic(s)**

**Call for proposal**

**Funding Scheme**

ERC-2012-ADG_20120216

**Host institution**

**KATHOLIEKE UNIVERSITEIT LEUVEN**

- Address
- Oude Markt 13
- 3000 Leuven
- Belgium

- Activity type
- Higher or Secondary Education Establishments

- EU contribution
- € 1 904 640

- Website

- Contact the organisation

- Principal investigator
- Piet Herdewyn (Prof.)

- Administrative Contact
- Elke Lammertyn (Dr.)
## Beneficiaries (2)

<table>
<thead>
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<th>Organization</th>
<th>EU contribution</th>
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<tr>
<td>KATHOLIEKE UNIVERSITEIT LEUVEN</td>
<td>€ 1,904,640</td>
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<tr>
<td>UNIVERSITE D'EVRY-VAL D'ESSONE</td>
<td>€ 595,360</td>
</tr>
</tbody>
</table>

### KATHOLIEKE UNIVERSITEIT LEUVEN
- **Address**: Oude Markt 13, 3000 Leuven
- **Website**: [Contact the organisation](#)
- **Principal investigator**: Piet Herdewyn (Prof.)
- **Administrative Contact**: Elke Lammertyn (Dr.)

### UNIVERSITE D'EVRY-VAL D'ESSONE
- **Address**: Boulevard Francois Mitterand 23, 91025 Evry
- **Website**: [Contact the organisation](#)
- **Administrative Contact**: Corine Le Grand (Mrs.)

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