ERC frontier research contribution to EU4Health

The European Research Council (ERC) follows a strictly bottom-up approach to funding research proposals, with excellence as the sole criterion for selection. The research that ERC grantees pursue, free of any thematic objectives, generates results that address a wide range of issues with significant socioeconomic, environmental and policy relevance. As a result, this rich and diverse portfolio of frontier research generates new knowledge and proposes concrete solutions for addressing some of the most pressing policy priorities of the European Commission. This is the case for the over 2000 projects funded by the ERC, worth more than €4 billion, in the Horizon 2020 (H2020) Framework Programme (2014–2020) that are relevant for ‘EU4Health’.

Data as of December 2021
This fact sheet provides an overview of the projects relevant for the selected areas of EU4Health. The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG), Advanced Grant (AdG) and Synergy Grant (SyG) schemes launched in the H2020 Framework Programme (2014–2020)*.

### Areas of interest for EU4Health

- Cancer
- Other non-communicable diseases
- Infectious diseases
- Public health and healthcare
- Tools, therapies and digital health
- Brain and human mind research
- Other health-related research

### 2281 ERC-funded projects, worth €4613 million

- **Physical sciences and engineering**
  - 408 projects, €844M
- **Life sciences**
  - 1482 projects, €3046M
- **Social sciences and humanities**
  - 391 projects, €723M

### Distribution of ERC-funded projects in Horizon 2020

2377 grantees lead 2281 projects and are based in 23 EU Member States, 6 Associated Countries (ACs) and 3 non-EU/ACs.

#### % of grantees with number per country

- EU
- ACs
- Non-EU/ACs

#### Host institutions with ≥37 funded projects

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Centre for Scientific Research (FR)</td>
<td>87</td>
</tr>
<tr>
<td>Helmholtz Association of German Research Centres (DE)</td>
<td>69</td>
</tr>
<tr>
<td>Max Planck Society (DE)</td>
<td>67</td>
</tr>
<tr>
<td>National Institute of Health and Medical Research (FR)</td>
<td>67</td>
</tr>
<tr>
<td>University of Cambridge (UK)</td>
<td>52</td>
</tr>
<tr>
<td>Weizmann Institute (IL)</td>
<td>49</td>
</tr>
<tr>
<td>University of Oxford (UK)</td>
<td>39</td>
</tr>
<tr>
<td>Karolinska Institute (SE)</td>
<td>37</td>
</tr>
</tbody>
</table>

#### Country of origin of grantees other than EU or ACs (≤4 grouped together)

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of grantees</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>6</td>
</tr>
<tr>
<td>Russia</td>
<td>6</td>
</tr>
<tr>
<td>Japan</td>
<td>9</td>
</tr>
<tr>
<td>India</td>
<td>10</td>
</tr>
<tr>
<td>Australia</td>
<td>12</td>
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<tr>
<td>China</td>
<td>16</td>
</tr>
<tr>
<td>Canada</td>
<td>27</td>
</tr>
<tr>
<td>United States</td>
<td>60</td>
</tr>
<tr>
<td>17 other non-EU/ACs</td>
<td>30</td>
</tr>
</tbody>
</table>

*Data as of December 2021
The scientific landscape of frontier research projects contributing to the selected EU4Health areas

- **Cancer**: 527 projects, €1082 million
- **Other non-communicable diseases**: 280 projects, €550 million
- **Infectious diseases**: 222 projects, €438 million
- **COVID-19**: 192 projects, €420 million
- **Brain and human mind research**: 600 projects, €1232 million
- **Public health and healthcare**: 316 projects, €618 million
- **Tools, therapies and digital health**: 678 projects, €1392 million
- **Other health-related research**: 299 projects, €590 million

The word clouds represent the most prevalent scientific fields in the pool of ERC projects identified as relevant for each of the selected areas of EU4Health. The total number of projects under each area as well as the budget are indicated.

30% of the 2281 projects contribute to two or more of these areas.
Methodological developments in projects contributing to the selected EU4Health areas

The main methodological development in the projects relevant for the selected EU4Health areas is in the field of *Computational modelling, simulations* with in silico model and machine learning being the focus. Other prominent methodological developments are *Experimental methods* with a focus on imaging and microscopy and *Animal models* with a focus on humanized and engineered mouse models.
Examples of projects contributing to the selected EU4Health areas

ERC grantee Irmela Jeremias’ LeukaemiaTargeted project focuses on effective leukaemia treatment. Their work introduces molecular target validation as an important step for precision medicine.

At the University of Cyprus, Triantafyllos Stylianopoulos focusses on biomechanical aspects of tumour microenvironment to predict immunotherapy outcome. Their team developed a mathematical model for this Immuno-Predictor project that was also used to study COVID-19 disease progression.

Nuria Montserrat studies kidney diseases and in particular how to regenerate mammal’s kidneys by modelling genetic kidney disorders. The engineered mini-organs developed with the REGMAMKID project have served as model to study SARS-CoV-2 infection.

With vAMRes, Rino Rappuoli originally tackled antibiotic resistance through the technology of reverse vaccinology, which was then used to screen for preventive and therapeutic tools against SARS-CoV-2.

Csaba Pál’s resistance evolution project and its proof of concept Aware provide unprecedented knowledge about antibiotic resistance evolution and tools to identify at an early stage of drug development antibiotic agents that are less prone to resistance growth.

Madeleine Lowery's DBSModel project and its proof of concept DBScontrol aimed at improving the control of Parkinson's disease symptoms by advancing the use of closed-loop deep brain stimulation.
Juergen Knoblich’s MiniBrain generated brain organoids, a highly cost-effective tool in the discovery and development of therapies for neurodegenerative and developmental diseases.

The AGNES project studied the determinants and modifiers of active ageing, including a study on the quality of life during COVID-19 pandemic.

Maria Collado studies the mechanisms behind the protective role of maternal microbes on the baby’s health. Their MAMI project opens up possibilities for research and applications in the field of personalized nutrition and medicine, for mothers and infants.

SmartCardiacPatch engineered a miniature heart, 3D-printed using biological materials from human patients, together with the next generation smart implantable cardiac patches to enable monitoring the organ in real-time.

Daniel Miller leads a world-wide SmartphoneSmartAging project examining the global impact of new social media and how the rise of the smartphone is changing people’s relationship to age and health.

The GutBCells project developed techniques to visualize the immune system and study the antibody immune response in the gut.