

Major opportunities in the Research Field Health in Europe

Position paper by the Helmholtz Association

a) Introduction

As a result of increasing life expectancies, the population of the EU is growing steadily older, and this demographic evolution presents a rising challenge to European society and European health systems. The **health and wellbeing** of citizens as well as the **prevention**, targeted **treatment** of diseases and **integrated care** represent global challenges. Since every person has a unique genetic disposition and reacts differently to environmental and lifestyle factors, **personalised medicine** is the only way to provide diagnostic methods and therapies that are safer, more effective and more economical than conventional therapies.

The long-term goal of health research is to **improve medical care and quality of life for the human population**. Consequently, preventive healthcare, personalised medicine, novel therapeutics and the full exploitation of biomedical information by **big data technologies** are long-term strategic perspectives.

To meet these challenges successfully, substantial **research efforts coordinated at the European level** are required. A key starting point to tackle the challenges is research on the molecular causes and pathogenetic mechanisms underlying diseases prevalent in modern civilisation.

The pursuit of truly **translational research** is essential to accelerate the transfer of research results into clinical therapies for the benefit of the patient and to realise the potential arising out of fundamental research through the development of clinical applications.

b) Future Directions

The following **five key research topics of the future** are related to the **global challenge "Health"** and along the lines set by the UN Sustainable Development Goals as well as WHO strategic aims and should be addressed at the European level:

Cancer Research

The aim of the "Cancer Research" programme is to significantly improve the prevention, early detection, diagnosis and therapy of cancer diseases. Molecular, cell-biological, system-biological, immunological and radio-oncological methods, and imaging technologies provide the basis for improving our understanding of cancer formation, for developing new diagnostic and therapeutic approaches and for illuminating the mechanisms of therapy resistances.

Cardiovascular and Multiple-Organ Disease Mechanisms

The research is concentrating especially on the ways complex mechanisms interact in multiple organs, with the aims of developing an integrative understanding of diseases, and of clinically applying such an understanding to the prevention, diagnosis and treatment of common diseases (with a special emphasis on cardiovascular diseases).

Infection Research

"Infection Research" studies selected bacterial and viral pathogens of high clinical and public health relevance, along with their interactions with host organisms. Complementary, another focus is on drug research, with specialty in the area of natural-substance research, in particular for the discovery and development of new anti-infective agents. The interplay of these areas and the resulting findings will support the development of new strategies for the early detection, prevention and therapy of infectious diseases.

Neurodegenerative Diseases

The topics being studied in this framework cover a broad range, and include basic signalling mechanisms, disease mechanisms, animal models, clinical and care research, large-scale genetic studies and population studies. This covers the entire chain of relevant research approaches: from scientific studies for the improvement of our understanding of underlying disease processes to scientific analyses for the improvement of concepts for patient care.

Genes and Environment in Common Diseases

The programme is focusing especially on diabetes, chronic pulmonary diseases and allergies – diseases with a strong environmental component. Innovative procedures for personalised prevention, diagnosis and therapy rely on an interdisciplinary approach bringing together health and environmental research and, bridging molecular-biomedical basic research, cutting-edge preclinical models and population as well as patient-based studies. Within this approach, state-of-the-art enabling technologies including omics methods, structural biology, stem cell-based approaches and environmental analytics as well as comprehensive bioinformatics expertise, medicinal chemistry and bioengineering are essential.

c) Missions for FP9

The Research Field Health has identified four proposals for missions which we are convinced would have the potential to bring important benefits to citizens. These missions have already been sent to the European Commission in 11/2017:

- **"A European initiative to turn cancer into a chronic disease"**
- **"EUDiaCure - Unified European Action for a Diabetes-Free Europe"**
- **"Reduction of Antimicrobial Resistance (AMR)"**
- **"Decreasing the burden of dementia"** (added in 03/2018)

(For further details please see our [mission paper](#), updated March 2018.)

Major activities are pursued at five Helmholtz Centres: the German Cancer Research Center ([DKFZ](#)) in Heidelberg, the Helmholtz Zentrum München – German Research Center for Environmental Health ([HMGU](#)), the Helmholtz Centre for Infection Research ([HZI](#)) in Braunschweig, the Max Delbrück Center for Molecular Medicine ([MDC](#)) in Berlin-Buch, and the nationwide German Center for Neurodegenerative Diseases ([DZNE](#)).

Other Centres that provide important contributions to specific programmes are the Helmholtz-Zentrum Dresden-Rossendorf ([HZDR](#)), the Helmholtz Centre for Environmental Research (UFZ) in Leipzig, and the Helmholtzzentrum für Schwerionenforschung ([GSI](#)) in Darmstadt.

Brief portrait of the Helmholtz Association

The Helmholtz Association contributes to solving major challenges facing society, science and the economy with top scientific achievements in six research fields: Energy; Earth and Environment; Health; Key Technologies; Matter; and Aeronautics, Space and Transport. With some 39,000 employees in 18 research centres and an annual budget of more than €4,5 billion, the Helmholtz Association is Germany's largest scientific organisation. Its work follows in the tradition of the great natural scientist Hermann von Helmholtz (1821-1894).

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