



## ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES



The CNRS supporting the 2030 Agenda – a few examples:

People's good physical and mental health depends not only on medical progress and access to healthcare facilities, but also on the quality of their environment. With an eye to developing a relevant health policy and reducing sanitary risks, the CNRS produces the knowledge required to understand the impact of environmental modifications (abiotic and biotic) on the dynamics, emergence or re-emergence of pathogens in any environment.

With global changes, disease vectors multiply and cross borders (mosquitoes) while point and non-point pollutions reduce the quality of the environment with a direct impact on living organisms and provoking new health risks (bio-toxicity, endocrine disrupters, nanoparticles) for human development and the well-being of populations. Health ecology aims to better understand the interactions between health determinants – which may be environmental, behavioural, social or genetic – and the environment. The development of bio-indicators to evaluate the toxicity of habitats or mixes of micro-pollutants facilitates the roll-out of disease control systems. Progressive medicine is based on the history of hygiene, health and epidemics and sheds light on the processes involved in the development and spread of diseases across territories.



### RIISING TO CURRENT AND FUTURE HEALTH CHALLENGES

#### Pathogenic viruses and bacteria

CNRS staff are active in many areas of research: the molecular and cellular mechanisms of infection, reproduction cycles, host resistance mechanisms at molecular and cellular levels, organism responses (immunology, infectiology), transmission modes between hosts, study of the effects caused by pathogens in their host, and more. They are thus able to study and answer the challenges posed by all pathogenic viruses and bacteria (e.g. HIV, hepatitis, Ebola and tuberculosis) and emerging pathogens and their vectors.

#### Mental health and well-being

Cognitive neurosciences take an increasingly central role in CNRS research and enable study of the effects of nutrition and stress of various origins on mental health and collective behaviour, neuro-developmental and neurodegenerative diseases, some of which are due to the environment.

#### Ageing

Ageing is one of today's key concerns and studies into the phenomenon are multi-scale, covering the ageing of cells, tissue and the organism. The observation of original vertebrate and invertebrate models also presents the paradigms of immortality and the knowledge of the genes and gene networks involved in these processes.

#### Study of environmental disruptions on health and reproduction

Health shows multi-factorial evolution. Hence, CNRS research in this field seeks to understand the links between genomes, cancer, reproduction, lifestyles and environment, and especially the effects caused by endocrine disrupters.

The impact of environmental changes on health is such that a new discipline has emerged: health ecology.



*This book takes a new progressive and ecological approach to address health issues, which is key given the risks of emergence or re-emergence of infectious diseases.*

## Antibiotics, vaccinations and medicine

CNRS researchers are active in areas such as the interface between chemistry and biology for the development of new molecules, antibioresistance phenomena, structural biology approaches, toxicological, pharmacological and physiological approaches and chemical library screening.

## Effects of toxic substances

The CNRS also studies addictions, including the effects of alcohol, tobacco and various narcotics on physiology.

## Health and society

While health is now a major concern in our societies, that has not always been the case. The CNRS studies the history and development of sanitary concerns with regard to health policies and economics, with special focus on social, spatial and environmental inequalities related to health practises. Relationships with the body, disease and medicine, the links between health and lifestyle changes, and healthcare practises are also explored by a number of research teams.

## DISCOVERY OF A MARKER OF HIV RESERVOIR: A NEW AVENUE TO ERADICATE THE VIRUS

Researchers have identified a marker that can be used to distinguish between 'dormant' cells infected by HIV and healthy cells.

This discovery makes it possible to isolate and analyse these reservoir cells which silently host the virus and are thus responsible for its persistence, even among patients under antiretroviral treatment and whose viral load is undetectable. It also opens the way for new therapeutic strategies targeting the infected cells. This work is part of the strategic 'HIV Reservoirs' programme run by the Agence nationale de la recherche. It is the outcome of collaboration between the CNRS, Montpellier University, Inserm, Institut Pasteur, Henri Mondor hospital in Créteil, Gui de Chauliac hospital in Montpellier and the VRI (vaccine research institute), and was covered in a publication in Nature journal on 15th March 2017. A patent, whose rights are owned by the CNRS, was registered for the diagnostic and therapeutic use of the identified marker.

## PAEDIATRIC CANCER: VALERIE CASTELLANI, THE 2018 INNOVATION MEDALLIST

Avec son équipe, cette chercheuse développe des approches expérimentales vers la problématique des cancers pédiatriques à partir de la compréhension des mécanismes cellulaires et moléculaires qui sous-tendent la génération des neurones dans l'embryon, leur migration et la mise en place de leurs connexions nerveuses via le guidage axonal. Ses travaux abordent l'apparition des tumeurs et la dissémination métastatique sous l'angle de la biologie du développement et des interactions des cellules tumorales avec leur microenvironnement immature.

Valérie Castellani a développé une technologie brevetée qui marque un véritable progrès pour la médecine. Elle permet

de rechercher de nouveaux biomarqueurs, de développer une médecine personnalisée en prédisant la réponse tumorale, et d'expérimenter des candidats médicaments. Cette innovation est exploitée par la start-up Oncofactory.

Find out more: [www.oncofactory.com](http://www.oncofactory.com)

## AUTONOMY AND SOCIAL INCLUSION

In 2015, the CNRS launched a cross-disciplinary, interdisciplinary challenge focused on the independence and social inclusion of people with diminished autonomy, endeavouring to generate some innovative projects.

The selected projects cover very different fields ranging from robotics to psychology and from sociology to information technology. Analysis of the solutions they provide is an opportunity to consider the issue of dependency with regard to the everyday environment of the people concerned and their life circumstances, leading to adaptations and innovations in their private space, and involving their cultural and social networks, including friends and family, caregivers and their social networks.



Find out more: [www.cnrs.fr/mi/spip.php?article961](http://www.cnrs.fr/mi/spip.php?article961)

## THE CNRS PARTNERS THE NATIONAL HEALTH INNOVATION DAYS

The CNRS has joined up with the Ministry of Health and Universities to take part in the National Health Innovation Days. This event invites all members of the public to meet the people who innovate for health day after day. Patients and associations, scientists and public organisations, healthcare staff and healthcare establishments, start-ups and companies are all welcome every year for a series of discussions, presentations, workshops, conferences and debates about the future of health.

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