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**Foreword—Breaking barriers in chemical biology: the innovative tour de force of the ChemBio GDR**

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Foreword

Breaking Barriers in Chemical Biology – Toulouse 2022

# Foreword—Breaking barriers in chemical biology: the innovative tour de force of the ChemBio GDR

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**Abstract.** Chemical Biology can be defined as the design and the development of molecular tools to decipher or modulate biological processes of interest so that they can be better understood, controlled or modified. It also consists in the observation and analysis of these molecular tools within, and in interaction with, their complex biological environment. Chemical Biology can then lead to highly valuable basic knowledge and be applied in diverse fields such as health and environment. Therefore, Chemical Biology has strong interactions with the design of therapeutic strategies, diagnosis, agrochemicals or Ecology.

**Keywords.** Interdisciplinary research, Molecular tools, Biological environment, Translational applications, Innovative strategies.

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## 1. ChemBio GDR genesis

In 2018, the Deputy Scientific Director of the National Centre for Scientific Research (CNRS) mandated us to organize a scientific event to assess the expertise of French scientific community in different research and application areas of Chemical Biology, as part of the scientific policy of the CNRS-Institute of Chemistry (INC) and the “Convergence Actions” program. The events, called the Scientific Days of Chemical Biology, were held in Lille in 2018 and then Nice in 2020. It was an opportunity for a prospective reflection, which resulted in January 2021 in the creation of the GDR 2095—ChemBio directed by Professor Christophe Biot (UGSE, Lille). The aim of the ChemBio GDR is to bring together scientists from the French Chemical Biology community, which includes about 80 laboratories and 600 members, making it the second largest GDR supported by the CNRS-INC. Aiming to support exchanges of scientific expertise and skills for chemists and biologists, ChemBio GDR is a fertile place for discussion leading to the emergence of new key scientific questions.

Just after its creation, the first ChemBio GDR scientific meeting was held in Grenoble in October 2021, and the second one took place in Toulouse in June 2022. The upcoming scientific meetings will be held in Strasbourg in June 2023 and in Bordeaux in 2024. In addition to these annual days dedicated to scientific exchange through oral, poster presentations, and round tables on various topics, the ChemBio GDR supports and is closely associated to the CNRS ChemBio thematic school directed by Professor Dominique Guianvarc’h (Paris Saclay University, ICMO). This intensive one-week formation was first organized in November 2021 in Le Touquet. Due to the success of the first edition, a second edition, also supported by the ChemBio GDR, will be organized in November 2023.

At the same time, in September 2019, considering the importance and the impact of the French Chemical Biology, the Thematic Group of Chémobiologie (SCF-ChemBio) was created within the French Chemical Society (SCF). This group currently has more than 500 members and is presided by Dr. Boris Vauzeilles (DR CNRS, ICSN). SCF-ChemBio collaborates with ChemBioChem (Chemistry Europe, Wiley) and the International Chemical Biology Society

(ICBS) with which two e-symposia were co-organised in April 2021 and July 2021. Besides, in 2021, SCF-ChemBio also joined the European Federation for Medicinal chemistry and Chemical biology (EFMC). In 2021, SFBBM (French Society for Biochemistry and Molecular Biology) has introduced a new session entitled “*Chémobiologie*” for its annual meeting that takes place every early July.

## 2. ChemBio GDR objectives

The ChemBio GDR has several objectives aimed at unifying Chemical Biology research in France and increasing its visibility and recognition (Box 1). One of the primary objectives is to connect researchers and teams across the country and establish a network that fosters the sharing of experiences, skills, and the launch of new research dynamics. GDRs are valuable coordination structures that have proven to be successful for several years.

Collaboration is another strength of the ChemBio GDR, and the complementary expertise and knowledge of participating researchers and teams contribute to the creation of fruitful collaborations and international projects. The ChemBio GDR is also involved in student training, including the organization of scientific workshops and on-site training through its platforms. The ChemBio GDR supports short-term scientific missions for PhD students between partner laboratories to acquire specific expertise and/or techniques.

The ChemBio GDR has a further objective of increasing awareness about technology transfer among researchers, especially those who are at the early stages of their careers.

Moreover, the ChemBio GDR also seeks to promote creativity and expand the borders of scientific culture by promoting interactions between national artists and ChemBio GDR researchers. This initiative encourages innovative methods for the progression of knowledge and subsequent transfer to society. By exploring the aesthetic dimensions of Chemical Biology and evaluating the outcome from the perspective of the non-scientific community, members can improve media diffusion practices and encourage a shift in practices based on scientific challenges towards the artistic community.

**Box 1—ChemBio GDR is articulated around 3 thematic axes**

- (1) Chemical targeting and modulation, understanding of biological processes: By developing molecular tools that can scan and modulate biological processes of interest, researchers in Chemical Biology are able to better understand and control those processes for a variety of applications.
- (2) Chemical tools and molecular approaches: Using a range of chemical tools and molecular approaches, researchers in Chemical Biology are able to design and develop new compounds and therapies for a wide range of applications, from drug discovery to agriculture.
- (3) Physicochemical technologies: Advancements in physicochemical technologies enable researchers in Chemical Biology to better study the complex interactions between molecules and biological systems, leading to new discoveries and breakthroughs in a variety of fields.

**3. 2nd ChemBio GDR scientific days**

The 2nd ChemBio GDR Scientific Days took place on June 8th and 9th, 2022 at the University of Toulouse III. This 2022 edition was closely related to the annual Chemistry–Biology–Health day in Toulouse, held on June 10th, 2022, which demonstrated the impact of chemical biology on the study and treatment of hu-

man diseases. The event had 148 registrations and spanned two days and was the opportunity to attend three plenary conferences, 14 lectures, 11 flash-talks, and two poster sessions. This special edition of “Comptes Rendus Chimie” is an opportunity to share with the scientific community the multidisciplinary research of the speakers who presented at this 2nd ChemBio GDR Scientific Days.



In this special issue on French Chemical Biology, we bring together a collection of cutting-edge research articles and reviews that highlight recent advances and exciting new directions in the field. It should be emphasized that the selection for this special issue was limited to the speakers who presented their work in Toulouse. Therefore, only the

articles/reviews from those speakers have been chosen for publication.

**Conflicts of interest**

Authors have no conflict of interest to declare.

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