NEWSLETTER 2023

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In 2023, research supported by the Alamaya Foundation once again received significant visibility on the international level thanks to the activities led by Kim Do Cuénod and her involvement in a great number of scientific committees.

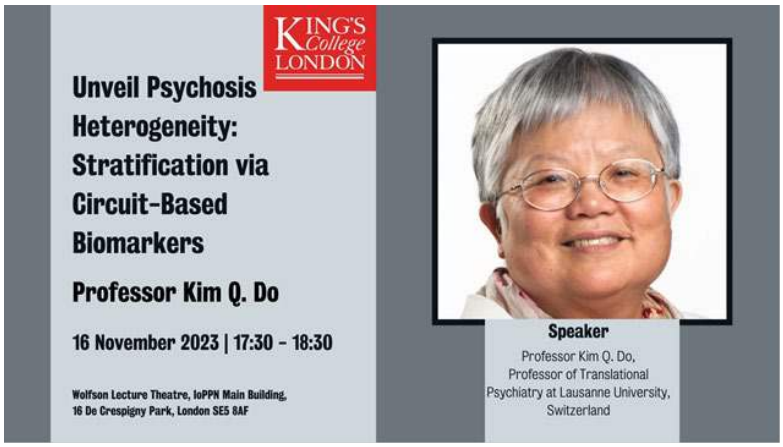
On 2 May 2023, Kim Do Cuénod gave a **talk** at **McLean Hospital** in Boston (USA). For over 200 years, McLean has led the way in psychiatric care, scientific discovery, professional training and public education. Today, McLean is the flagship hospital of **Harvard Medical School** in terms of mental health.

From 7 to 10 May, she took part in the **34th World Congress of the International College of Neuropsychopharmacology** (CINP), which was held in Montreal (Canada). At this congress, she chaired a symposium, during which she also gave a presentation as a speaker.

As a member of CINP's **Fellowship and Awards Committee**, she also presented the prizes awarded each year to young researchers by the College.

Following the CINP Congress, Kim Do Cuénod travelled to Toronto (Canada), where the **Annual Conference of the Schizophrenia International Research Society** (SIRS) was held from 11 to 15 May.

During the conference, she took part in a symposium as a speaker and, as **Chair of the Awards Committee**, presented the Society's prizes to both young and established researchers. The prizes awarded by SIRS are among the most prestigious in the field of psychiatric research worldwide.



On 16 November 2023, Kim Do Cuénod was invited to give the **Paul Janssen Lecture** at the **Institute of Psychiatry, Psychology & Neuroscience** of **King's College** in London (UK). For almost 20 years, the Paul Janssen Lecture has been the highlight of the Institute's academic calendar. Lecturers are chosen on the basis of their worldwide eminence in the field of neuroscience and, more specifically, of schizophrenia. This annual conference is named in honour of the Belgian pharmacologist Paul Janssen (1926-2003), known for having discovered several important drugs in the field of psychiatry. The conference can be accessed via the following link: www.kcl.ac.uk/ioppn/paul-janssen-lecture

SSBP SWISS SOCIETY OF BIOLOGICAL PSYCHIATRY
SGBP Schweizerische Gesellschaft für Biologische Psychiatrie
SSPB Société Suisse de Psychiatrie Biologique
SSPB Societá Svizzera di Psichiatria Biologica
www.ssbp.ch
S S B P
Member of the WORLD FEDERATION OF SOCIETIES OF BIOLOGICAL PSYCHIATRY

The Annual Meeting 2023 of the **Swiss Society of Biological Psychiatry** (SSBP) took place on 9 November in Bern. It was held at the Waldau Campus, which is part of the University Psychiatric Services (Universitäre Psychiatrische Dienste, UPD). At the meeting, Kim Do Cuénod handed over the presidency of the Society, which she had held since November 2020, to Prof. Sebastian Walther of the University of Bern. She remains a member of the SSBP Executive Committee as Past President.

The **Young Investigator Award 2023** was granted to Dr Luis Alameda, a clinician scientist in the Department of Psychiatry at Lausanne University Hosptial (Centre Hospitalier Universitaire Vaudois, CHUV). The prize is worth CHF 5,000 and is awarded annually by the SSBP to the best original scientific contribution to the advancement of the treatment and understanding of the biological basis of mental disorders. The author must not be over 40 years of age and must work and participate in scientific projects in Switzerland or be a Swiss citizen if working in another country. Applicants must demonstrate that they are conducting independent research.

News from Research

Clinical Trial with MitoQ

As explained in the newsletter 2022, the clinical trial with MitoQ had to be reorganised and postponed due to administrative issues involving SwissEthics and SwissMedic. Further information will be provided in the newsletter 2024.

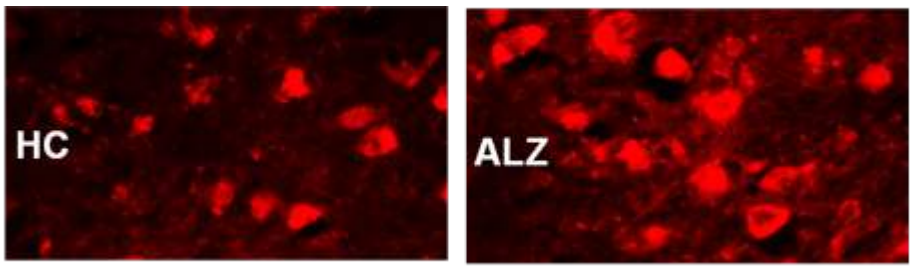
As a reminder, MitoQ is an antioxidant specifically targeted at mitochondria, which provide the energy essential for the proper functioning of neurons, in particular parvalbumin interneurons (PVI); these interneurons play a key role in cognitive, affective and social activities, and are damaged in the brains of patients suffering from schizophrenia. If the study is successful, **treating schizophrenia patients with MitoQ will improve their symptoms and cognitive functions, which are not well treated by current antipsychotics**. Better cognition is essential for improving social and professional functioning, as well as overall quality of life.

BIOMARKERS FOR COGNITIVE DEFICIT IN ALZHEIMER'S DISEASE

Kim Do Cuénod supervises a project led by Dr. Ines Khadimallah, research group leader at the Center for Psychiatric Neurosciences (Department of Psychiatry, Lausanne Unversity Hospital). This project focuses on **identifying biological markers to detect cognitive disorders in Alzheimer's disease**.

Converging evidence has shown that parvalbumin interneurons in the cortical microcircuit are essential for the normal execution of all cognitive functions. These neurons are very sensitive to oxidative stress and neuroinflammation, whose toxicity increases with age. Therefore, there is a need for biomarkers to detect the impairment of parvalbumin interneurons at an early stage, when mild cognitive impairment appears.

Dr. Khadimallah recently identified two markers that selectively detect oxidative stress induced by mitochondria (which provide the essential energy for proper neuronal functioning) in parvalbumin interneurons: exosomal plasma levels of miR-137 overexpression and COX6A2 downregulation are associated both with deficiencies in parvalbumin interneurons in the animal model and with cognitive deficits in patients. The project is thus based on the hypothesis that **the alteration of cortical microcircuits of parvalbumin interneurons could be the basis of the cognitive deficits observed in the early stages of Alzheimer's disease, particularly in subjects with mild cognitive impairment**.



Increased markers of oxidative stress in the brain tissue of patients with Alzheimer's disease (ALZ) compared with healthy subjects (HC - Healthy Controls)

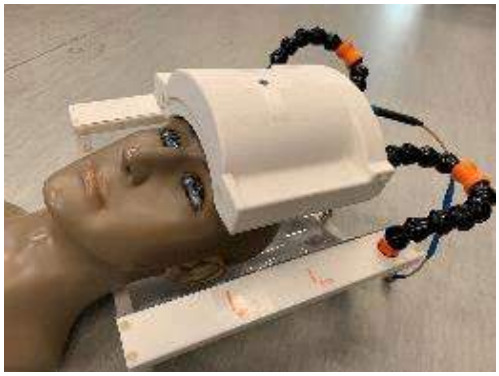
The proposed project will help better understand the cerebral physiopathology associated with the dysregulation of the mitochondrial network in parvalbumin neurons and the resulting oxidative stress. If the integrity and function of cortical parvalbumin interneurons are affected in subjects with mild cognitive impairments, this will provide **important insights into the cellular and molecular mechanisms related to mitochondrial impairment of parvalbumin interneurons in Alzheimer's disease**.

Furthermore, this study is expected to provide new information on certain cognitive deficits that could help better characterize individual patients, in order to ensure **adequate monitoring/prevention of disease progression and treatment**.

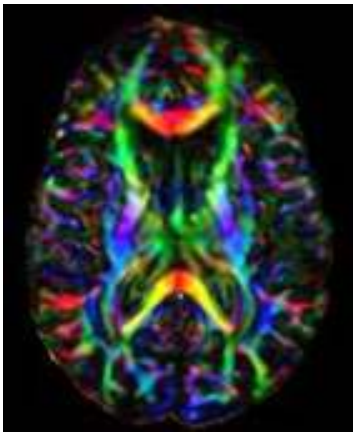
ADVANCING FUNCTIONAL MAGNETIC RESONANCE SPECTROSCOPY: TOWARDS A SENSITIVE TOOL TARGETING NEUROMETABOLIC ALTERATIONS

Kim Do Cuénod is also participating in a project led by Dr. Lijing Xin, a researcher at the Center for Biomedical Imaging (CIBM) of the École Polytechnique Fédérale de Lausanne (EPFL).

Advances in functional neuroimaging have been essential in **determining the functional roles of brain regions in neurological and psychiatric disorders**. However, very little is known about the dynamics of the underlying neurochemical and metabolic composition related to brain function in healthy or diseased subjects.



Magnetic resonance spectroscopy (MRS) is a non-invasive neuroimaging technique that allows the *in vivo* study of metabolites (organic substances formed during metabolism or that participate in it) in various metabolic pathways. Analyzing the brain's compensatory mechanism that maintains metabolite concentration within a limited range during a dynamic process (functional activation or stress state) will potentially be a suitable approach to **capture abnormal metabolic changes in neurological and psychiatric diseases**.



Dr. Lijing Xin's project focuses on developing and validating advanced MRS methodologies for functional neurometabolic studies. To this end, rapid acquisition methods for MRS will be implemented to achieve high temporal resolution during dynamic measurements. Then, an initial application for analyzing neurometabolic changes during a cognitive task will be conducted to demonstrate its relevance in studying brain functions. Finally, to evaluate the validity of the developed methods and begin applying them to specific neurobiological questions, they will first be tested in healthy young and elderly subjects to study age-related metabolic signatures.

This project will significantly advance neurometabolic imaging techniques by providing a sensitive tool to capture metabolic dynamics in the human brain. It will also **enhance neurobiological knowledge of human brain function and the pathophysiology of diseases, and promote new therapeutic targets**.

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