GO-DS21

Gene Overdosage and comorbidities during the early lifetime in Down Syndrome

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 848077.

Elucidating the link between intellectual disabilty, obesity, and other comorbities

WHY IT MATTERS

Down syndrome is the most common genetic form of intellectual disability in the world, with an incidence of 1 in 1000 births, affecting more than 5 million people worldwide. It is characterized by an extra copy of human chromosome 21 (trisomy 21). Within the European population, the prevalence of Down syndrome remains high due to increased maternal age and lack of prenatal monitoring in certain at-risk populations. In addition, increased life expectancy makes people with Down syndrome a significant proportion of the population with a need to be better investigated in order to improve their health-care.

Mental and physical conditions, such as intellectual disability and obesity, appear at a much higher rate in individuals with Down syndrome compared to the general population. Obesity in people with Down syndrome also increases their risk of developing obstructive sleep apnea (a potentially deadly breathing disorder), dyslipidemia (an abnormal amount of lipids in the blood), hyperinsulinemia, type-2 diabetes, and gait problems.

Understanding the underlying causes and biological pathways for these conditions is therefore of major importance to improve the health of people with Down syndrome. Despite the complexity, the genetic cause of Down syndrome is clear: the genes on chromosome 21 are present in overdose (3 copies instead of 2). This will help us to unravel the underlying mechanisms for obesity and other comorbidities.

REAL-WORLD IMPACT

GO-DS21 uses newly generated preclinical and clinical data from existing clinical cohorts in addition to newly generated data. Data points emerge from the so-called "Down syndrome comorbidities network" which includes data from cohorts in the UK (more than 6,000 cases), France, Spain, and three other European clinics. Next to the clinical data sets, GO-DS21 will investigate project-relevant hypotheses in preclinical animal models for a better understanding of Down syndrome. We explore how intrinsic (genetic and pathway-driven) and extrinsic (environmental and epigenetic) factors lead to common comorbidities. The project's results may also be applicable to people suffering from other types of intellectual disability.

- → Novel biomarkers for accurate and early diagnosis
- → Innovative new therapies and novel national and international clinical guidance
- → Prevention and better management of obesity
- → Improved management of intellectual disabilities
- → Enhanced monitoring through clinical measurements and fluid biomarkers
- → Better understanding of the interaction between obesity and cognitive impairment
- → Increased visibility and awareness of Down syndrome and related research

Down syndrome is the most common genetic form of intellectual disability in the world

Photo credit: SDI Productions

Photo credit: izusek

OUR VISION

GO-DS21 aims to identify and validate new causative mechanisms underlying comorbid conditions, primarily intellectual disability and obesity, in Down syndrome. People with Down syndrome often have a combination of mental conditions (intellectual disability, autism, or affective disorders) as well as physical impairments (cardiac and haematological defects, obesity, and gastrointestinal abnormalities).

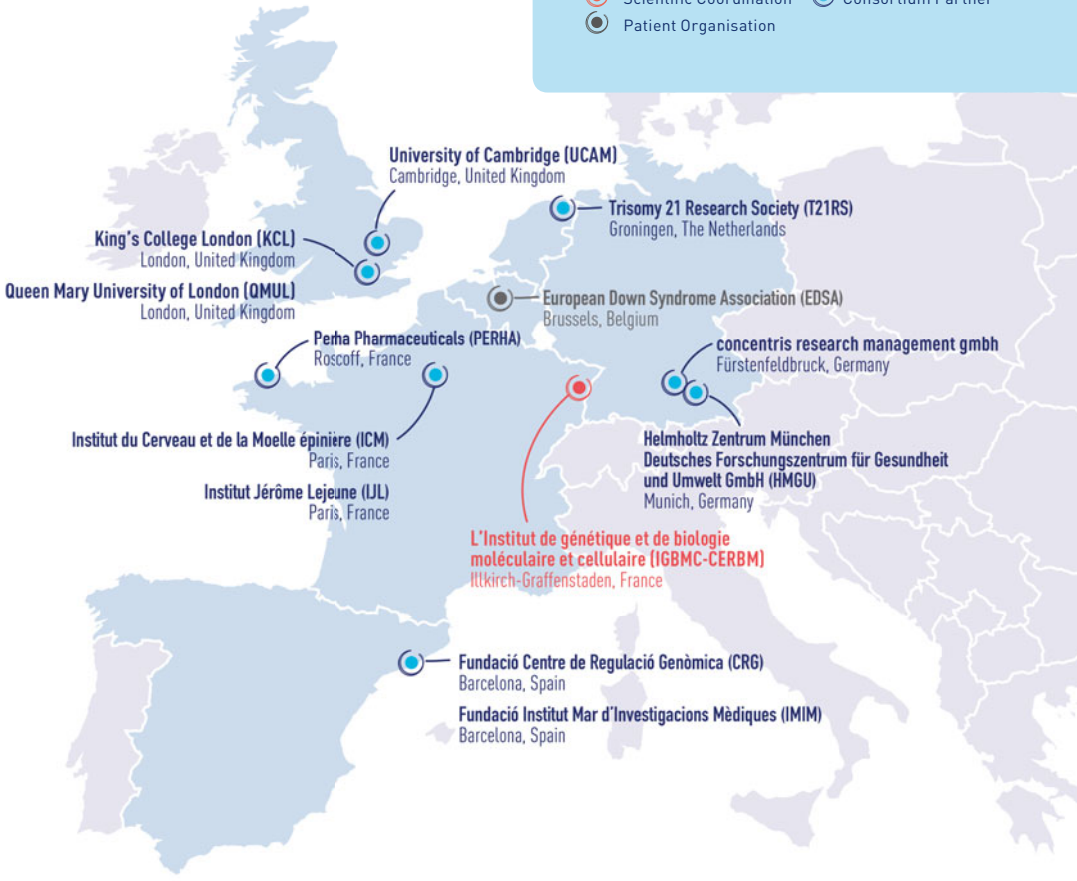
On a larger scale, our research will not only increase the understanding of these comorbidities in Down syndrome but also elucidate the link between obesity and mental conditions in the general population. Obesity is a major risk factor for many chronic diseases, contributing to the death of more than 2.8 million people every year. Moreover, obesity is related to cognitive impairment, increasing dramatically in populations with intellectual disability.

The innovative approach of this interdisciplinary research project unites basic and clinical researchers as well as experts on pathophysiology, bioinformatics, and artificial intelligence. GO-DS21 strives to improve early diagnosis, prognosis, and treatment of conditions that co-occur in Down syndrome. We will establish new clinical recommendations and identify novel and well-targeted early-lifetime interventions to prevent or at least minimize the development of obesity within the context of intellectual disability. These may also have application in the general population.

RESEARCH CONSORTIUM

12 institutions and 1 patient organisation from 6 European countries with combined expertise in human and mouse phenotyping, molecular biology, and computer modelling

Scientific Coordination
Consortium Partner
Patient Organisation



GO-DS21 IN A NUTSHELL

Full project title	**G**ene **O**verdosage and comorbidities during the early lifetime in **D**own **S**yndrome
Start date	01 January 2020
Duration	60 months (5 years)
Participants	12 institutions from 6 European countries
EC funding	6 million €
Project website	go-ds21.eu

CONTACT

Scientific Coordination	**Dr. Yann Hérault IGBMC-CERBM,** Illkirch-Graffenstaden, France herault@igbmc.fr
Project Management	**Andrea Wohner** concentris research management gmbh Fürstenfeldbruck, Germany andrea.wohner@concentris.de

Follow us on Twitter: twitter.com/GO_DS21

Photo credits: metamorworks, BlackJack3D (little composing)