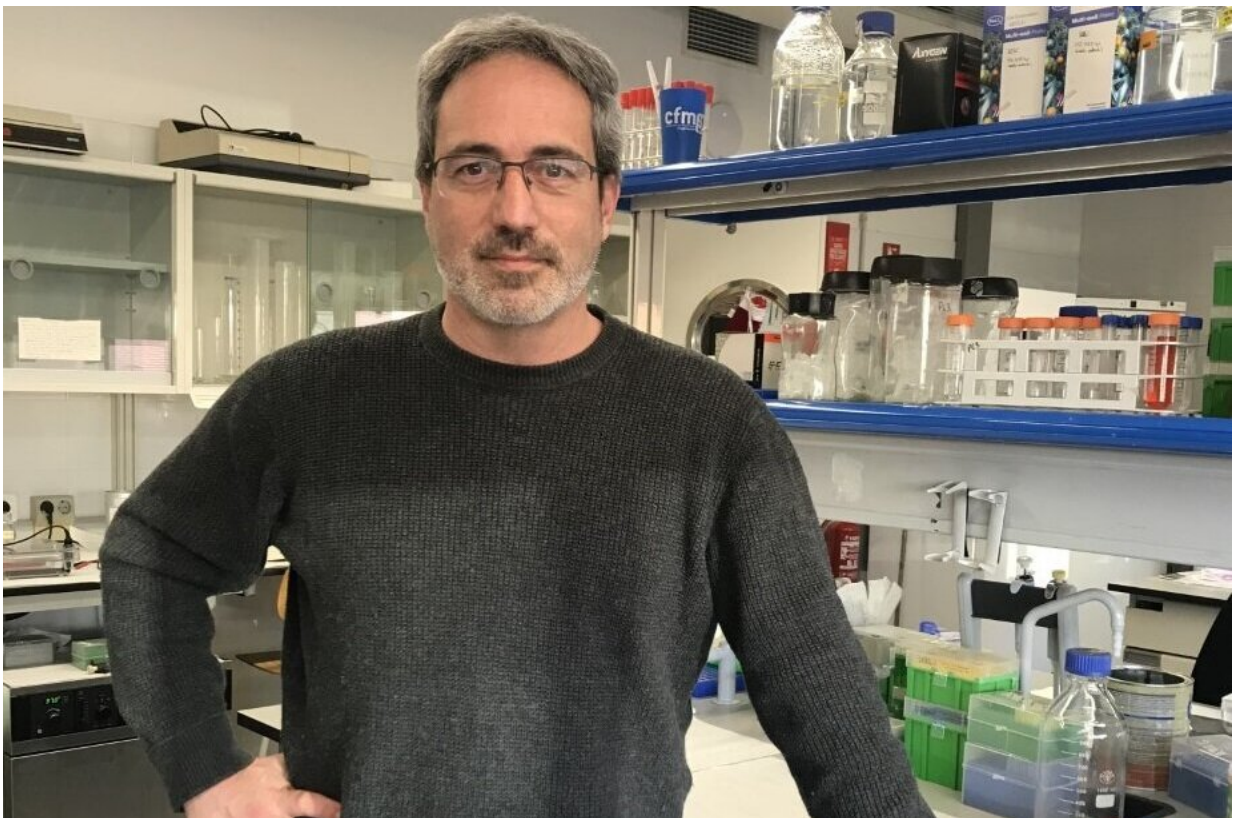


# Study analyzes the risk genetic factors shared between ADHD and disruptive behavior disorders

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Professor Bru Cormand, from the Faculty of Biology and the Institute of Biomedicine of the University of Barcelona (IBUB), IRSJD i and CIBERER.  
Credit: Universidad de Barcelona

People with attention-deficit / hyperactivity disorder (ADHD) combined with disruptive behavior disorders (DBDs) share about the 80% of genetic variants associated with aggressive and antisocial behaviors.

This is one of the conclusions of a study published in the journal *Nature Communications* which counts on the participation of professor Bru Cormand, from the Faculty of Biology and the Institute of Biomedicine of the University of Barcelona (IBUB), Sant Joan de Déu Research Institute (IRSJD) and the Rare Diseases Networking Biomedical Research Centre (CIBERER), and researchers Marta Ribasés and Josep Antoni Ramos Quiroga, from Vall d'Hebron Research Institute (VHIR) and the Mental Health Networking Biomedical Research Centre (CIBERSAM).

The study –the most ambitious one published to date on risk [genetic factors](#) shared between people with ADHD and DBDs—is based on the study conducted to about 4,000 affected people by these pathologies and 30,000 control individuals, within the frame of the European project Aggressotype, from the Horizon 2020 program, aimed at doing research on the neurobiological basis of the aggressive behavior. The study is led by Ditte Demontis and Anders D. Børglum (Aarhus University, Denmark) and Stephen V. Faraone (State University of New York, United States).

### **ADHD: a psychiatric disorder that does not always come alone**

ADHD is a common behavior disorder –it affects about 5% of children and 2.5% adult people—and features hyperactivity, impulsiveness and attention deficit. This disorder usually comes with other psychiatric alterations, mainly disruptive behavior [disorders](#) (DBDs), which can be associated with antisocial and aggressive behaviors.

"ADHD and DBD are caused by genetic and environmental factors.

Regarding ADHD, it is estimated that genetics account for a 75%, while in DBDs, it would oscillate between 40 and 70%. These clinical pictures are more frequent in boys than girls, and when they come together, people are more likely to fall into risky behaviors, addictive substance use, and premature death," notes Bru Cormand, professor at the Department of Genetics, Microbiology and Statistics and head of the Research Group on Neurogenetics of the UB.

"Certain people feature two or more psychiatric disorders, and this coexistence continues, in many cases, in a chronological axis, in which suffering from a psychiatric disorder such as ADHD involves opening the door to other comorbid pathologies that aggravate the life quality of those who suffer from the disorder," notes Marta Ribasés, head of the Laboratory of Genetic Psychiatry of Vall d'Hebrón Research Institute (VHIR).

Through [genome-wide association studies](#) (GWAS), researchers analyzed the genetic contribution of changes in a single DNA nucleotide (SNP) –the most abundant ones in the [human genome](#)—to these [psychiatric disorders](#). As part of the study, VHIR and UB experts brought samples of patients with ADHD diagnosed at Hospital Vall d'Hebron and took part in the analysis of genetic data.

### **More risk genetic variants in patients with ADHD and DBDs**

The research team identified a genomic segment in the chromosome 11 which increases the risk of having ADHD combined with DBD. "This region has the STIM1 gen, which is involved in the regulation of calcium cell levels, neuronal plasticity and learning memory," notes Bru Cormand, who coordinated the international working group on genetics in the Aggressotype project.

"Our study shows that genetics are more determining in people with

ADHD and DBD than those who only suffer from ADHD," highlights Bru Cormand. "If we compare the genome of patients with ADHD and DBD to that of those patients with only ADHD, we see that people affected by both disorders have a higher genetic correlation with risk genetic variants. These extra correlations of ADHD and DBD patients would probably correspond to alterations other authors had related to aggressive-related behaviors," notes Cormand.

"If we consider ADHD to be an open door to a negative trajectory, using genetic information to identify those individuals who are more vulnerable will have a strong impact on prevention, early detection and treatment, and will shed light on new research studies to find efficient therapies that can be specific for the disorder or shared between several disorders," notes Marta Ribasés.

The study, published in the journal *Nature Communications*, is a new science advance that will contribute to broaden the genetic landscape of ADHD comorbidities (that is, the series of pathologies that are correlated with this disorder). From a clinical perspective, knowing the psychiatric alterations that share genetics is a step forward, because it will enable the prediction of potential secondary complications over the life of those individuals with ADHD.

"These results allow us to better understand the origins of DBDs associated with ADHD and provide better information to the family members about this disorder," concludes Josep Antoni Ramos Quiroga, head of the Psychiatry Service of Hospital Vall d'Hebron and the Research Group on Mental Health Psychiatry and Addictions at VHIR.

**More information:** undefined undefined et al. Risk variants and polygenic architecture of disruptive behavior disorders in the context of attention-deficit/hyperactivity disorder, *Nature Communications* (2021). [DOI: 10.1038/s41467-020-20443-2](https://doi.org/10.1038/s41467-020-20443-2)

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