Children with psychiatric disorders such as obsessive-compulsive disorder (OCD) and attention deficit hyperactivity disorder (ADHD) suffer from highly disabling symptoms that interfere with their ability to function in day-to-day life. We know that not only do these disorders often persist into adulthood but they can also put the child at risk for later development of other problems including depression and substance use disorders. OCD and ADHD run in families, strongly suggesting that genes are involved in the development of these conditions. We also know that these disorders affect specific brain circuits. Despite our progress in learning about these conditions, we still do not really understand what genes are involved in ADHD and OCD and how variation in these genes can lead to dysfunction in brain circuits. One exciting but as yet under-explored avenue of psychiatric genetic research is the study of animals that exhibit compulsive, impulsive or hyperactive traits similar to what is seen in OCD and ADHD. Both dogs and mice exhibit these traits and can provide different kinds of clues. Dogs, particularly purebred dogs, are particularly helpful because their genomes tend to be more similar (each breed is effectively like a large family) which makes mapping of genes easier than in humans who are genetically more different from one another. Mice, on the other hand are particularly useful because it is possible to test the influence of genetic variants on their brains in a very precise manner in a laboratory setting. Our group, the Comparative Behavioural Genomics Consortium (CBGC) will take the highly innovative approach of studying OCD- and ADHD-related traits across humans, dogs and mice. By doing so, we hope to gain novel insights about how genetic variants lead to childhood psychiatric disorders and ultimately to identify new avenues for early identification and treatment of these devastating conditions.

CONTACT:
Hannes Lohi: hannes.lohi@helsinki.fi
+358 9 191 25085, +358 9 191 25073
Paul Arnold: paul.arnold@sickkids.ca
Rui Costa: ruicosta@fchampalimaud.org
+351 210480109

WWW.AKA.FI/MIND

Research project of the Human Mind Research Programme

DISCOVERING GENETIC RISK VARIANTS FOR NEUROPSYCHIATRIC DISORDERS AND THEIR CONSEQUENCES USING DOGS, HUMANS AND MICE

Principal Investigators: Hannes Lohi, Paul Arnold, Rui Costa

Figure 1. A schematic overview of the proposed novel and original research strategy to identify novel genes, pathways and related neural circuits in common neuropsychiatric disorders through cross-species phenomic and genomic analyses (human, dog, mouse). The CBGC will apply novel "phenomic" approaches including the use of related behavioural tasks in both dogs and humans for gene identification. The analyses of the function of identified gene variants in neural circuit activity and behavior will then be performed in mice. We propose that mapping genes conferring risk for behavioral traits in dogs and humans will facilitate the discovery of genetic risk factors for common and serious neuropsychiatric disorders including ADHD and OCD.