Crespi presents fascinating new diametric model of autism and psychotic disorders at Douglas theatre

By **Nancy Tinari**

The excitement outside the Laura C. Muir theatre was palpable on Friday, Feb 4 as a large number of students, faculty members and members of the public crowded the lobby, talking about Dr. Bernard Crespi's upcoming lecture and partaking in the generous refreshments.

By 6:50 the theatre was packed. Thor Borgford, Dean of Science & Technology at Douglas, explained that Dr. Crespi's lecture, entitled "Where Darwin meets Freud" was the first in a four-part series to be held at Douglas in the coming weeks, all part of the Year of Science sponsored by the BC government.

The next speaker was Dr. Laura Dane, faculty member in the Faculty of Humanities and Social Sciences at Douglas. She gave a brief introduction to Dr. Crespi, who is a Professor of Biology at SFU. His work has been published in over 100 papers, and has earned him world-wide press coverage and prestigious awards.

Dr. Crespi immediately established good rapport with his audience by explaining that his interest in evolution came naturally—being from a family of eight children, he had to learn about "survival of the fittest" at an early age!

He quickly moved on to describe his particular interest in what he calls the human "social brain." What makes us human is not just that we are smart (Dr. Crespi drew laughs by using Homer Simpson as his example), but that we are *socially* smart. Autism and psychotic disorders like schizophrenia, bipolar disease or severe depression both result in abnormal social behaviours.

Six traits are critical in our social brain. The middle column in the table below shows these traits as they are manifested in "normal" human beings. The left and right columns show the corresponding behaviours in people with autism or psychotic disorders.

Autism	Normal	Psychotic Disorders
no speech or less speech	Language	auditory hallucinations
reduced sense of self—often refer to themselves in 3rd person	strong sense of self	megalomania (delusions of grandeur)
treat people more like things	mentalistic skill (the ability to know that others are thinking, and to speculate about their thoughts and intentions)	paranoia—think people are always thinking about them, plotting against them
lack of social emotions	social emotionality	extremes of depression, elation
mechanical logic only	logical, analytical skill	loose, chaotic thought associations—not based in reality
no long-term goals	complex, regulated goal pursuit	mania—often about sex or money
Low	**----------Normal----------**	**High**

The novelty (and controversial nature) of Dr. Crespi's theory is that autism and psychotic disorders like schizophrenia, bipolar disorder or severe depression are both influenced by genetic variability in the same suite of genes. He calls this a "diametric model."

This can be explained at a genetic level by "imprinted" genes. All of us receive one set of genes from our mothers and another set from our fathers. With imprinted genes, only the gene from one of our parents is expressed; the other is silenced. According to Crespi, if there are "mistakes" in the way the on/off switches that control whether the mother's or father's version of the gene is activated, the result is that the gene may not be expressed at all, or its expression may be doubled.

Crespi posits that these variations at the genetic level can result in observable behaviour abnormalities in the social brain traits mentioned above. Under-expression of an imprinted gene leads to a deficit in normal social brain traits (autism) while over-expression of an imprinted gene leads to hyper-activity of these traits (schizophrenia, bipolar disease).

Support for the idea that imprinted genes have a role to play in the causation of autism and psychotic conditions comes from recent studies with mice. A statistically significant percentage of genes known to be involved in schizophrenia and autism are imprinted genes. However, Crespi was quick to point out that imprinted genes are only one of the genetic factors that contribute to these highly heritable conditions, and environmental factors are significant as well.

Dr. Crespi concluded by outlining the value of his concept that autism and psychotic conditions are part of human cognitive diversity, a diversity that "can be considered in the context of human evolution." The idea that traits of the human social brain exist on a spectrum should help reduce some of the stigma of mental disease.

In addition, studies of the human brain at a genome-wide level will be possible in about two years. Such a "human imprintome project"(HIP)—a wonderful acronym, Dr. Crespi pointed out—would allow a much more thorough understanding of the genetic bases for autism and psychotic disorders. In turn, this should allow individualized drug therapies following the concept that these disorders may be partially caused by under-expression or over-expression of the same genes.