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MEDIA RELEASE | 23 FEBRUARY 2006

UBC researchers find potential new target for autism, retardation therapies

An international team, led by neuroscientists at the University of British Columbia, have discovered the “on-off switch” that controls how chemical messages are exchanged in the brain, a finding that may lead to new therapies for autism, schizophrenia and mental retardation.

Alaa El-Husseini, an assistant professor of Psychiatry and a member of the Brain Research Centre at UBC, along with UBC PhD student Kim Gerrow, led the three-year investigation. Together with researchers at the University of Milano in Italy and the University of Calgary, they uncovered a group of protein molecules that can promote or disrupt formation of synapses – where nerve cells communicate using chemical messengers.

The research was published in the Feb. 16, 2006 issue of *Neuron*.

“We now know the fundamental mechanism that controls chemical communication in the brain,” says El-Husseini. “This offers a new focus for developing treatment for diseases caused by chemical imbalances in the brain, such as autism.”

Using sophisticated equipment to view brain messaging at the cellular level, the team witnessed, in animal models, how the protein group assembles at sites of contact between nerve cells to form new synapses.

The investigators showed that by manipulating the function of one of the proteins, known as PSD-95, they could turn synaptic activity up or down. Specifically, they showed that disrupting the function of PSD-95 provoked a loss of excitatory synapses (chemical messages that stimulate brain cell activity) and an increase in inhibitory synapses (messages that diminish activity).

The findings reveal an important mechanism by which nerve cells control the chemical balance critical to healthy brain function. When balance is disrupted, the flow of information among brain cells in certain areas becomes confused. The result is impairments in perception, thought and behavior seen in patients with brain disorders ranging from retardation and autism to major psychoses including schizophrenia and depression.

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“This is an important discovery for the millions of Canadians who suffer from psychiatric disorders caused by chemical imbalances in the brain. The work of Dr. El-Husseini and his team could soon provide patients with effective treatments and allow them to be active again in our society,” says Inez Jabalpurwala, president of NeuroScience Canada, whose Brain Repair Program helped support this research. “Psychiatric disorders cost the Canadian economy billions of dollars, including healthcare costs and lost productivity.”

Researchers are now examining whether new strategies such as use of interference peptides that modulate these proteins' function may help to correct the chemical imbalance associated with many brain disorders. Researchers estimate it will be about five years before the findings can be incorporated into new therapies.

Project support totaling more than \$2 million comes from NeuroScience Canada; the Canadian Institutes for Health Research; the EJLB Foundation in Quebec; and the Michael Smith Foundation for Health Research.

Fifty percent of all Canadians – about 15 million people – have had a brain disorder, or injury of the brain, spinal cord or nervous system impact their family. Based on Health Canada data, the economic burden of these disorders is conservatively estimated at \$22.7 billion annually.

Founded in 1998, NeuroScience Canada is Canada's umbrella organization and voice for the neurosciences. Through partnering with the public, private and voluntary sectors, NeuroScience Canada connects the knowledge and resources available in this area to accelerate neuroscience research and funding, and maximize the output of Canada's world-class scientists and researchers.

The mission of NeuroScience Canada's Brain Repair Program™ is to fast-track neuroscience research in order to develop treatments and therapies more quickly. Through the Brain Repair Program, NeuroScience Canada and its donors and partners have already invested \$4.5 million in research teams conducting breakthrough work in the area of brain repair.

The Brain Research Centre at UBC Hospital is a multidisciplinary centre dedicated to improving understanding and finding new treatments for brain diseases. The centre is a partnership of UBC and Vancouver Coastal Health Research Institute, the research body of the health authority.