

Many people know that serotonin is “the happiness molecule.”

It’s the substance, produced in the brain stem, involved in regulating mood and sleep, among other important functions.

Dr. Larry Jordan, a professor in the Department of Physiology and Pathophysiology at the University of Manitoba’s Faculty of Medicine, is

investigating ways in which serotonin could be the key to allowing recovery of movement after spinal cord injury.

With support from an **MHRC/Faculty of Medicine Manitoba Partnership Program Grant**, Jordan is investigating the transplantation of neurons that produce serotonin into the spinal cord.

Serotonin, he explains, increases the excitability of neurons that create the rhythms involved in locomotor movements, as well as turning on the neurons involved in co-ordination. Movement, or to be more specific, locomotion, requires both a regular rhythm and co-ordination of flexor and extensor muscles around the joints, as well as coordination of the left and right lower limbs.

“A major effect of spinal cord injury is to interfere with co-ordinated activity,” says Jordan. “You can have an absence of co-ordinated activity between the left and right side, or you can have the flexors and extensors going at the same time.”

Animal models have shown that after a spinal cord injury, muscles may be rhythmically active but not co-ordinated. However, when serotonin is added, co-

ordination returns, and the flexors and extensors as well as the left and right legs begin working at the correct time.

“There’s plenty of indication that the human spinal cord contains a similar set of neurons that just have to be turned on.”

The neurons that produce serotonin – called serotonergic neurons – are found in the brain stem and normally project to the spinal cord. In Jordan’s experiments, serotonergic neurons from mice will be transplanted into the spinal cords of paraplegic rats, and then activated so that they release serotonin.

Jordan has been investigating the nervous system for more than four decades. After completing his PhD in neurophysiology at the University of Texas, Jordan came to Winnipeg in 1970 as a post-doctoral fellow. He was the founding director of the Health Sciences Centre Winnipeg/U of M Spinal Cord Research Centre.

In his current research, he will collaborate with a colleague from Warsaw, Poland, as well as colleagues in Winnipeg.

“This will allow us to do the experiments to determine if activation of these neurons can make a difference,” he says.

