MedicalXpress

How JC Polyomavirus invades cells

October 7 2013

For more than a decade the research group of Brown University Professor Walter Atwood has doggedly pursued the workings of the JC polyomavirus, which causes a disease called PML that fatally degrades the central nervous system of patients with weakened immune systems. In a study published online Oct. 2 in the *Journal of Virology*, his team describes how it gains entry into cells: It breaks in via certain receptors of the neurotransmitter serotonin called 5-HT2 receptors.

Atwood, lead author and graduate student Benedetta Assetta and their co-authors showed this by inserting more than a dozen different serotonin receptors into cells that normally can't be infected. Of all 14 receptors, only the three 5HT-2 receptors facilitated infection.

"This paper is significant because it re-defines the role that serotonin receptors play in JC Polyomavirus infection," Atwood said. "Our initial hypothesis was that these receptors played a direct role in virus binding to cells. We now know that this is incorrect. A second carbohydrate molecule, LSTc, is what facilitates binding and we confirm that here."

The research, Atwood said, could lead to improved treatment for PML, for instance by informing how existing drugs work.

"The present study provides new insights on three different serotonin receptors which are potential drug targets," Atwood said. "Several 5-HT2 receptor inhibitors, both selective and non-selective, are FDA-approved and commonly used to treat neurological disorders. One of these drugs, mirtazapine, has been administered in patients with PML

and results have been mixed but it does appear that the use of mirtazapine is most successful if administered early at the onset of PML symptoms."

The researchers are now looking at why these three specific serotonin receptors facilitate infection, while the others do not.

Provided by Brown University