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Hydrocephalus reduces the cell proliferation and increases fractone complexity in the adult sub ventricular-ventricular zone

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Hydrocephalus is due to a disturbance in production, flow and/or absorption of cerebrospinal fluid. Experimental models of hydrocephalus, especially sub-acute and chronic hydrocephalus, are few and limited, and their effects on the sub-ventricular zone (V-SVZ) are unclear. The aim of this study was to analyze the effects of chronic hydrocephalus on the V-SVZ, a neurogenic niche lining the lateral ventricles. We developed a new method to induce hydrocephalus by obstructing the aqueduct of Sylvius in the mouse brain that mimics the aqueductal stenosis seen in humans. In 120-day-old rodents (n=18 per group), the ventricular dilatation and cellular composition of the V-SVZ were studied by immunofluorescence and transmission electron microscopy. In 25 adult patients (age > 18 years), the sizes of the V-SVZ, corpus callosum, and internal capsule were analyzed by magnetic resonance images obtained from patients with and without aqueductal stenosis. Mice with 60-day hydrocephalus had a reduced number of Ki67+ and doublecortin+ cells on immunofluorescence, as well as decreased number of neural progenitors and neuroblasts in the V-SVZ on the electron microscope analysis as compared to non-hydrocephalic mice. A number of extracellular matrix structures (fractones) contacting the ventricular lumen and blood vessels were also observed around the V-SVZ in mice with hydrocephalus. In humans, the widths of the V-SVZ, corpus callosum, and internal capsule in patients with aqueductal stenosis were significantly smaller than age and gender-matched patients without aqueductal stenosis. Conclusion, Hydrocephalus reduces the proliferation of neural progenitors, modifies the cytoarchitecture of the V-SVZ and white matter.

Biography

Oscar Gonzalez-Perez has completed his PhD from University of Colima and Post-doctoral studies from University of California San Francisco, School of Medicine. He has published more than 50 papers in reputed journals.

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