

**Professor Arthur Butt**  
**University of Portsmouth**

**Student: Andrea Rivera**

### **A novel glial cell with neural stem cell properties**

The adult brain has a limited capacity for neurogenesis and repair. The little neurogenesis that occurs in the adult is restricted to highly localised neurogenic regions in the subventricular zone of the lateral ventricle and the hippocampus. In addition to neurons, the main cell type in the brain are glia. Glia perform many recognised supportive functions that are essential for the normal operations of the brain. An unexpected new role for glia is as a source of neural stem cells. We have provided evidence that two specific glial cell types - astrocytes and novel NG2-glia - from non-neurogenic regions of the brain have an intrinsic neurogenic capacity. The aim of this project is to identify key regulators of glial fate decision and begin to unravel the mechanisms that control their neurogenic potential. Since astrocytes and NG2-glia are widely distributed and abundant throughout the adult CNS, they provide a potential endogenous source of neurons throughout life. We hope that understanding the factors that regulate glial neurogenesis may eventually help us treat neurodegenerative diseases, such as Alzheimer's disease and multiple sclerosis, as well as stroke and physical trauma.

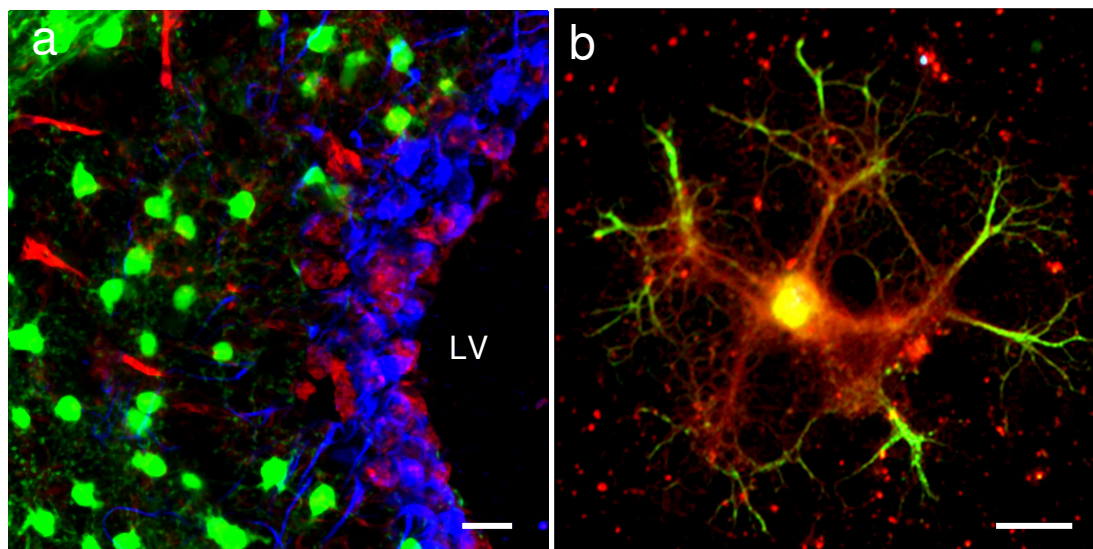


Figure. Astrocytes are a source of neural stem cells. (a) A section through the neurogenic region of the subventricular zone (LV = lateral ventricle), immunolabelled for neural stem cells (red, nestin), astrocyte-like neural stem cells (blue, glial fibrillary acidic protein), and oligodendrocyte precursors (green, Sox10). (b) Astrocyte isolated from a non-neurogenic region of the brain immunolabelled for the astrocyte marker glial fibrillary acidic protein (red) and the neural stem marker nestin (yellow). Co-expression appears yellow and indicates astrocytes from non-neurogenic regions have a neural stem cell potential. Bar = 20  $\mu$ m.