

Running title: BASP1 and neurogenesis

## **BASP1 Labels Neural Stem Cells in the Neurogenic Niches of Mammalian Brain**

Louis N. Manganas<sup>a#</sup>, Irene Durá<sup>b, d</sup>, Sivan Osenberg<sup>e, f</sup>, Fatih Semerci<sup>e, f</sup>, Mehmet Tosun<sup>e, f</sup>, Rachana Mishra<sup>e, f</sup>, Luke Parkitny<sup>e, f</sup>, Juan M. Encinas<sup>b, c, d</sup> and Mirjana Maletic- Savatic<sup>a, e, f#</sup>

<sup>a</sup> Department of Neurology, Stony Brook University Medical Center, Stony Brook, New York, United States of America

<sup>b</sup> Achucarro Basque Center for Neuroscience, Spain

<sup>c</sup> IKERBASQUE, the Basque Foundation for Science, Spain

<sup>d</sup> Department of Neuroscience, University of the Basque Country (UPV/EHU), Spain

<sup>e</sup> Departments of Pediatrics, Neurology and Neuroscience, Baylor College of Medicine, Houston, Texas, United States of America

<sup>f</sup> Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital, Houston, Texas, United States of America

# Corresponding authors:

Louis N. Manganas, MD, PhD

Associate Professor, Department of Neurology

Stony Brook University Medical Center

Health Sciences Center T-12, room 020

Stony Brook, NY 11794

Tel 631 444 2599 Fax 631 444 1474 email: [louis.manganas@stonybrookmedicine.edu](mailto:louis.manganas@stonybrookmedicine.edu)

Mirjana Maletic-Savatic, MD, PhD

Associate Professor, Departments of Pediatrics, Neurology, and Neuroscience

Baylor College of Medicine

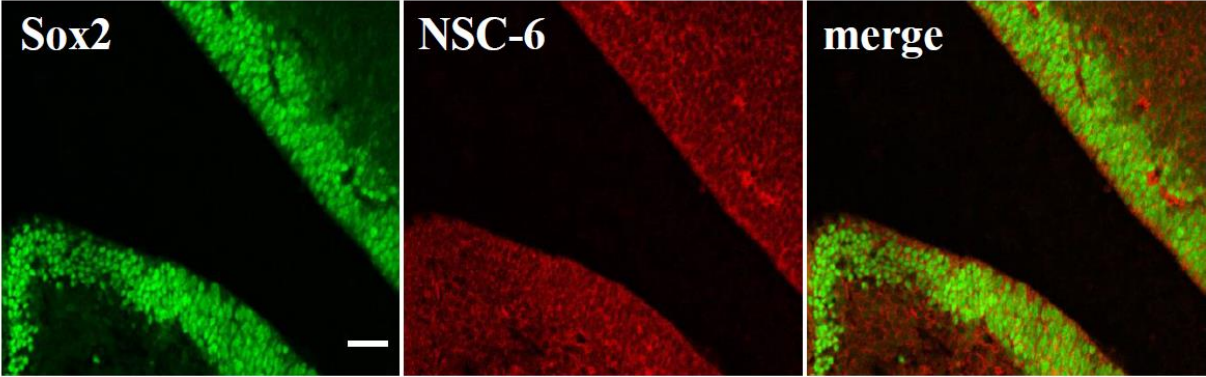
Jan and Dan Duncan Neurological Research Institute at Texas Children Hospital

1250 Moursund St., Rm 1250, Houston, TX 77030

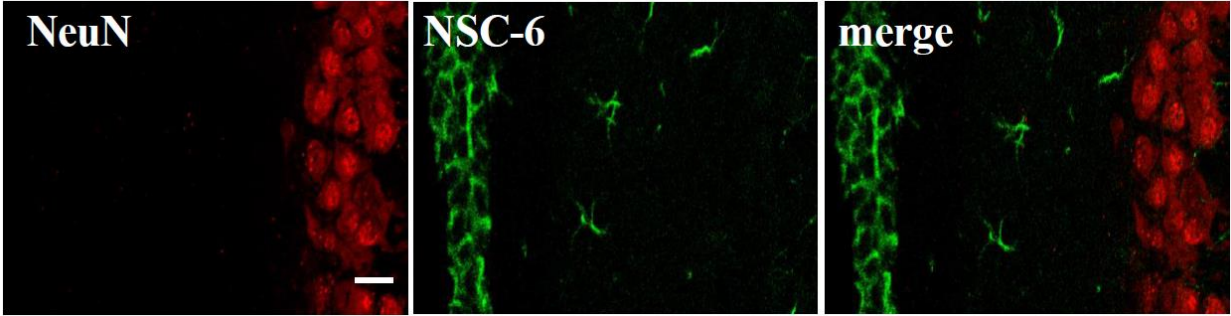
Tel 832-824-8807 Fax 832-825-8234 email: [maletics@bcm.edu](mailto:maletics@bcm.edu)

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Supplementary Figure 1.

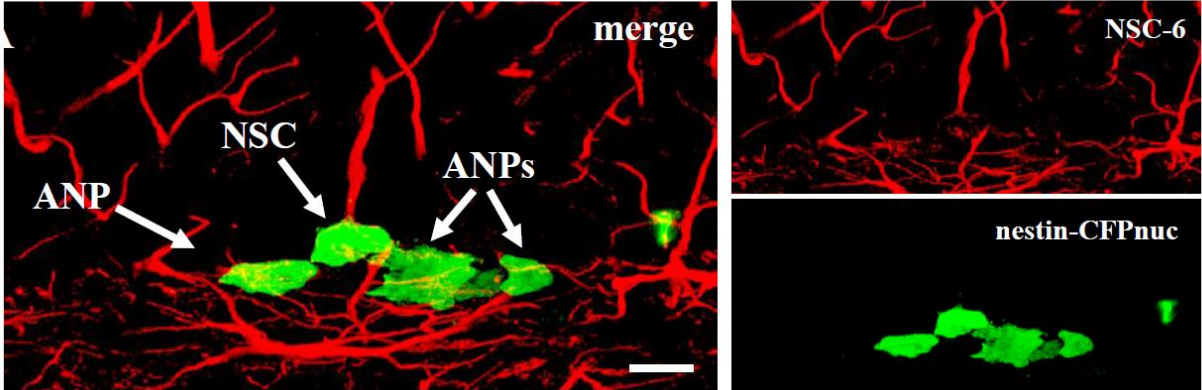


Supplementary Figure 2.

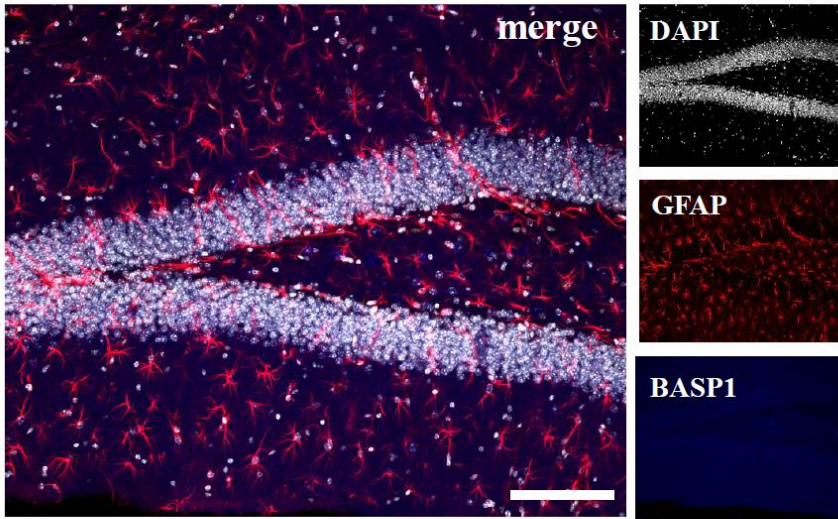


Supplementary Figure 3.

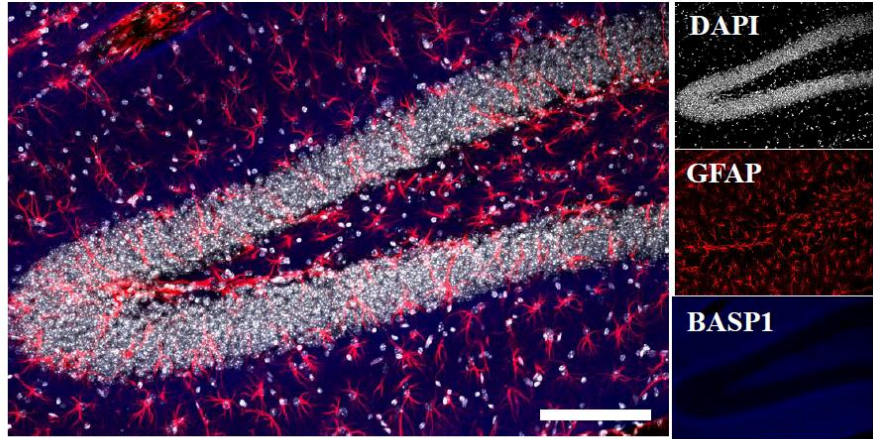
A



B BASP1 (Bioss)

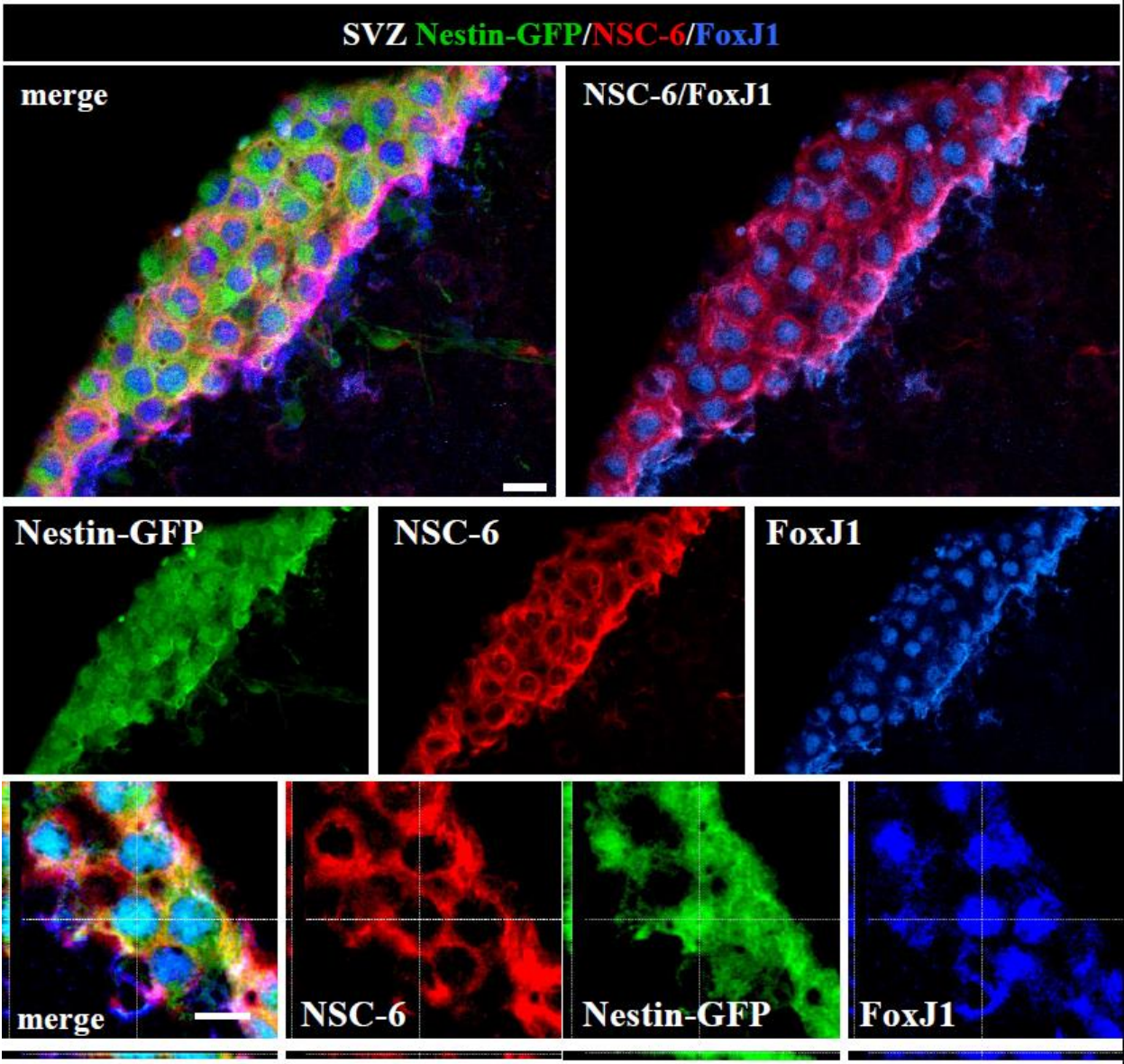


C BASP1 (Thermo Fisher)

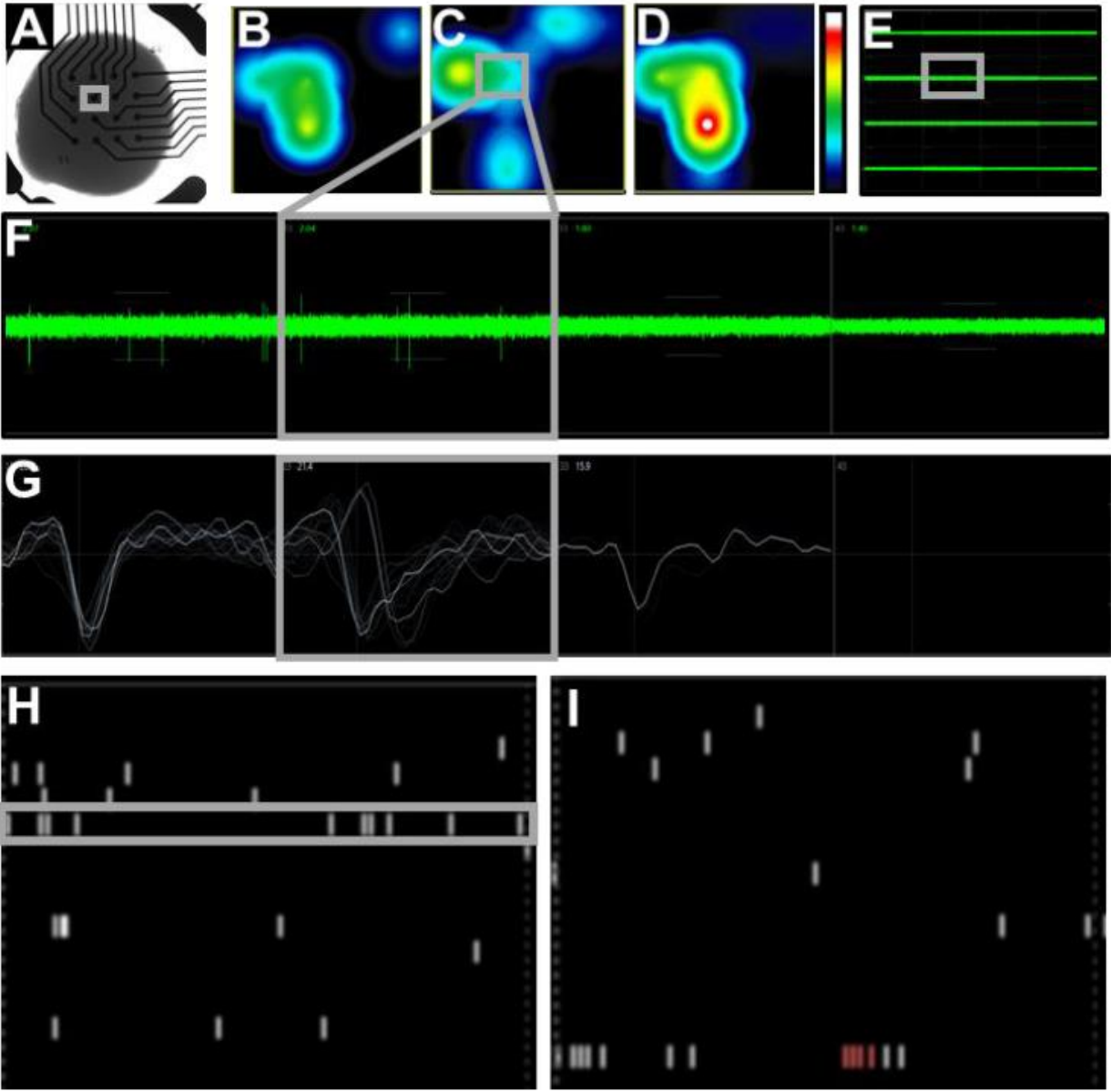




Supplementary Figure 4.



Supplementary Figure 5.



**Supplementary Figure 1.** NSC-6 antibody does not label Sox2+ amplifying neuroprogenitors in the subventricular zone of the embryonic mouse brain. Scale bar is 50  $\mu\text{m}$ .

**Supplementary Figure 2.** NSC-6 antibody does not label mature NeuN+ neurons in the adult mouse parenchyma. Scale bar is 40  $\mu\text{m}$ .

**Supplementary Figure 3.** (A) Immunolabeling with the NSC-6 antibody differentiates between NSCs and ANPs in the dentate gyrus of the *Nestin*-CFPnuc transgenic mice. Commercial BASP1 antibodies from Bioss (B) and Thermo Fisher (C) do not colocalize with GFAP and do not label NSCs in the dentate gyrus of a 3-month-old wild-type C57Bl6 mouse. Scale bar is 5  $\mu\text{m}$  in A and 200  $\mu\text{m}$  in B, C.

**Supplementary Figure 4.** NSC-6 immunolabeling in the SVZ colocalizes with FoxJ1, a marker of ependymal cells. *Nestin*-GFP staining (A), NSC-6 staining (B), FoxJ1 staining (C), *Nestin*-GFP/NSC-6 /FoxJ1 (D) and NSC-6 /FoxJ1 (E). Scale bar 10  $\mu\text{m}$ .

**Supplementary Figure 5.** 4-month-old organoids exhibit spontaneous neuronal activities. (A) An organoid in a well of 48-well microelectrode array (MEA) plate. Gray square points to one electrode out of 16 in the well. (B-D) Heat maps show the neuronal activities detected by 16 electrodes at 3 timepoints (auto scaled, max 4 spikes/sec). (E) Neuronal activity detected by 16 electrodes over 500msec (max 20 $\mu\text{V}$ ). (F) Continuous waveform plots show neuronal activity detected by 4 electrodes over 500 msec (max 20 $\mu\text{V}$ ). Each spike represents an action potential from neurons around an electrode (average amplitude= 20.1 $\pm$ 1.36 $\mu\text{V}$  and frequency=2.99 $\pm$ 0.03 spikes/sec (mean  $\pm$  SE, n=1275). (G) Spike plots show action potentials detected by 4 electrodes over 500msec (max 10 $\mu\text{V}$ ). (H) Spike plot shows the spikes detected by 16 electrodes over 5sec. (I) Spike plot from a different organoid. The group of red spikes is a burst firing. A $\rightarrow$ C, E $\rightarrow$ H Boxes in corresponding figures represent recordings from the same electrode.