During embryonic neurogenesis, cell-cell and cell-matrix interactions are critical for proper development of the central nervous system. In the adult brain, areas considered embryonic reservoirs called "neurogenic niches", show proliferating cells located in the vicinity of the ventricles. In previous studies, our group reported the existence of numerous proliferative zones, located on the wall that lines the ventricles of the telencephalon (VT), optic tectum (TO) and torus longitudinalis (TL) of fish of Austrolebias genus (Fernández, 2011). Different cell populations can be distinguished with both: cytosqueletal and plasma membrane specializations (Rosillo, 2010; Casanova, 2011). In spite of, some epithelial specializations at the central nervous system of higher vertebrates have been described (García Verdugo, 2002), information available on this topic is scarce. Austrolebias brain showed a widespread distribution of radial glial cells mainly located in medial zones lining with the ventricular walls, as has been demonstrated using immunohistochemical analysis performed with antibodies against Vimentin, S-100, BLBP and Glial Acidic Fibrilar Protein (view Rosillo et al., 2014).

In this work confocal laser, transmission electron and scanning microscopy analysis, showed that neurogenic niche cells are laterally linked through different and well developed intercellular junctional complexes. We observed extensive gap junctions between cells, as well as tight junctions sealing the ventricular wall. Often is possible to observe one or more desmosomes of different lengths, arranged in tandem, linking the plasma membrane of neighboring cells. Atypical adherens junctions were also detected. The continuity between adherens junctions and desmosomes with cytoskeletal components is evident. Cytoskeleton shows great development in "radial glia like" cells at TL, an elongated structure in the midbrain of Actinopterygii fish, linked to vision (Northmore, 1984). Using antibodies linked to fluorescent probes, we observed that cells rich in intermediate filaments, alternate with others with less developed cytoskeleton. Apically, the cells bordering the ventricular lumen of the neurogenic niches, often have microvilli and cilia. The analysis by SEM established that these are monociliated cells. The conservation of epithelial specializations in progenitor candidates cells, reinforces its functional significance. In this paper we analyze the location, ultrastructural features and molecular composition of such specializations, in the Austrolebias brain.
Fig. 1: Panoramic confocal image of cells of the telencephalic ventricular wall showing vimentin+ intermediate filaments and Cx 43 gap junctions.

Fig. 2: Panoramic TEM image of the ventricular torus longitudinalis region showing membrane specializations such as microvilli and cilia. Inset: High magnification of transversal section of a cilium.

Fig. 3: SEM micrograph showing the apical pole of cells from the ventricular telencephalic lumen which are predominantly monociliated.