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### **A 3-D in vitro neural stem cell niche derived from mouse embryonic stem cells**

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Our laboratory works with cell therapies for injuries to the central nervous system and neurodegenerative disorders, including the neuronal ceroid lipofuscinoses (NCLs) or Batten's Disease. We are working toward a treatment for this NCL through the development and application of an in vitro stem cell niche. Recent studies show that adult neural tissue can harbor stem cells within unique niches. In the mammalian central nervous system, neural stem cell (NSC) niches have been identified in the dentate gyrus and the subventricular zone (SVZ). Stem cells in the well-characterized SVZ exist in a microenvironment established by surrounding cells and tissue components including transit-amplifying cells, neuroblasts, ependymal cells, blood vessels and a basal lamina. Within this microenvironment, stem cell properties including proliferation and differentiation are maintained. Current NSC culture techniques often include the addition of molecular components found within the in vivo niche, such as mitogenic growth factors. We have described a novel NSC culture system, derived from mouse embryonic stem (ES) cells, that displays elements of a NSC niche in the absence of exogenously applied mitogens. Here, we explored the transfer of this system to a 3-D hydrogel environment and analyzed the retention of the putative neural stem cell within this 3-D environment. Application of this 3-D matrix will be important as it mimics a tissue-like environment. Future plans include transplantation of this culture system for the replacement of cells lost due to neurodegenerative disease and protection of cells that would otherwise be lost due to disease progression.