In the United States, there are currently 250,000 patients living with paralysis due to spinal cord injuries, with another 12,000 new cases appearing annually [1]. Neural stem cells (NSCs) can be injected into a patient at the site of injury to help restore function by replacing damaged neurons and/or producing cells that protect and promote the growth of existing neurons [2]. Previous trials of NSC therapies required 20 million cells per patient, delivered in a single injection [3,4]. There is currently a shortage of NSCs on the market, with the high demand going unmet due to the complex and costly steps required to produce large numbers of NSCs of adequate quality for injection. Because the central nervous system has immune privilege, patients can safely receive NSCs from a generic cell line [5]. The hypothetical process described here can take in a frozen vial of 100,000 induced pluripotent stem cells (iPSCs) and produce a large batch of NSCs.

### Process Economics

- $134,220 fixed investment cost (excluding building)
- $1,784,262 cost per batch
- 8.17x10^10 NSCs produced per batch
- 10 batches produced per year
- 40,850 patients supplied per year
- $655 price per patient to make 1.5 times expenditure

### Quality Control Measures

- Remove spontaneously differentiated colonies in dishes
- Test differentiation potential of cells throughout process by culturing embryoid bodies and neurospheres
- Karyotype assessment of final cell batch

### References