Neural stem cells essay

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The evolution of more ethical ‘ Induced Plenteous Stem Cells’ derived artificially from non-plenteous cells, such as adult somatic cells, avoids the dated argument of embryo cell usage; allowing for the advancement in research and the discovery of the practical benefits these cells present (You et al. 2007 A recent interest in the field of Neuroscience has seen research into the feasibility and therapeutic potential of utilizing tautology’s bone marrow cells (ABEAM), which can be transplanted into a host and give rise to neural elements. An tautology’s stem cell transplant, usually involves obtaining stem cells from the patient’s own marrow which are retrieved, grown in vitro and returned to the body (Steam et al. 2003.) Previous research including that of Ukrainian, Main, Unshaken and Secondary (2012) as well as Vailrest and Assonance (2003), demonstrate differing views on the effectiveness Banc’s, and each present convincing but opposing data towards the topic. These articles aim to determine whether stem cells from a different tissue origin (bone marrow) would serve as an ideal alternative to embryonic stem cells; which are safe, readily available and an teeth chicly acceptable source of cell therapy.

Ukrainian et al. (2012) conducted an experiment on 31 non- randomized patients (1 1 experimental, 20 control) suffering a sub-acute final cord injury (SIC), involving ABEAM transplantation into cerebration’s fluid via lumbar puncture (LAP) and undertook preoperative and follow up neurological assessments for 12-33 months. It was found, as seen in Table 1, that five out of 11 experimental patients (45. 5%) and three out of 20 control patients (15%) showed marked recovery (statistically borderline, &0.

095), and neither group suffered any adverse reactions or complications; concluding that transplantation of Bancs via LAP is a feasible and safe technique, however further research will advance clinical potential. Firstly the experiment consisted of a ‘ limited’ and ‘ non-randomized’ patient population involving only 1 1 experimental participants who were chosen specifically by the researchers from the American Spinal Injury Association (grade A), which may influence the interpretation of the statistically borderline result. To improve reliability of these findings a larger group involving a minimum of 50 experimental participants, and a double blind randomized sample from the same association should be taken. The fact that human participants were used with very similar confounding factors including type of fracture (thoracic), gender, and age (33. 8 8. 9), improved both the fairness and credibility of the results. Secondly, Banc’s were administered into the patients cerebration’s fluid via a lumbar puncture (B-LA), proving to be minimally invasive allowing for the safe and efficient delivery of Banc’s to the injured spinal cord. A limitation in regards to method is that the delivery of Banc’s may have occurred at a therapeutic level (safe, effective therapy), that is not optimum.

The method employed by Ukrainian et al (2012) requires time (14-43 days) for cell preparation and expansion possibly impacting the therapeutic window and number of transplanted cells. A suitable therapeutic window is suggested to be 3-4 weeks following injury for stem cell treatment, by Savoy et al. (2006) and between 2-8 weeks according to Yon et al. (2007.) Lastly, The American Spinal Injury Association has devised an impairment scale;

grade A-E, based on amount of sensory and motor functioning in different regions.

Ukrainian et al (2012) ensured that all participants are of the same injury type of grade A, whereby no motor or sensory function is preserved in the sacral segments SO-4, thus improving the fairness of the experiment but possibly decreases the reliability as the findings may not apply to individuals from grades B-E with slightly different spinal injuries. Ukrainian et al (2012) utilized the Fischer exact test; a statistical test that determines if there are any non-randomized associations between two variables, to compare treatment success between groups. This is efficient and simple in that it produces a clear P value of statistical significance however is considered to be conservative possibly decreasing the experiments significance.

Vailrest & Assonance (2003) designed an experiment to test for the potential of bone marrow derived cells (BOMB) to transferability into rural elements; by examining the phenotypes fate of the donor derived cells, through inoperativeness labeling for green fluorescent proteins of Bomb’s in mice killed at and 12 months following transplantation. Results, as seen in table 2, show that Bomb’s do not give rise to neural, endothelial or microbial characteristics in normal or neural shocked mice, however of those that crossed the endothelial of the cerebral cortex gave rise to perpendicular macrophages, potentially proving to be a therapeutic advantage to stimulate macrophage formation following injury for recovery ND repair. Vailrest & Assonance (2003) experiment fails to state exactly how many mice were used in total and how many were killed at each time (month), therefore decreasing the reliability of the results as readers are unsure as to how many

mice were tested. However utilizing mice as an experimental participant proves to be a cheap, small sized, easy to store for and are easy to reproduce; sharing numerous genetic and physiological characteristics with humans.

Vailrest & Assonance (2003) found no green fluorescent protein staining in any cerebral region following mice destruction IA lethal radiation exposure, however ensured that it was not due radiation- induced neuronal death by employing Floor-jade, a selective marker for degenerating neurons, in which no cells exhibited a positive label (Schemed et al. 997.) This method improves the validity of the experiment by addressing underlying factors that may have affected the experiment result, avoiding the argument that BOMB differentiation failed to occur due to radiation-induced neuronal death. Vailrest findings contrast sharply with findings from other research including that of Giggliest and Enzyme (1997), and Wingman et al. 2003) who discovered that Bomb’s can give rise to neural cell characteristics in vivo. This discrepancy found in Vailrest experiment could be due to the use of the inoperativeness of green fluorescent proteins which can be seen as an unspecific/less sensitive histological method that lacks high resolution analysis (three dimensional.) Future research could couple incomprehensibility with another marker method such as in situ habitations, which is highly specific, provides quantitative results and is standardized for positivist (Wingman et al.

003) Future research is required to determine whether bone marrow stem cells re endowed with free or restricted capacity of multilingual differentiation through implementing these suggested solutions to the

limitations of these experiments, as well as utilizing the effective strategies which improved their validity and reliability to ensure the credibility of future findings. If found to be a safe and effective treatment, this knowledge will allow for numerous practical implications including the potential of Neuron-regeneration for those suffering from central and/or peripheral nervous damage or abnormality.