

A mouse model for intra-bone marrow transplantation in leukemia research

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Mouse intra-bone marrow transplantation (IBMT) is a common method of introducing material directly into the bone marrow. It has been extensively used in studies ranging from stem cell therapy to cancer research.

However, despite this method being in use for decades, there has not yet been a comprehensive study of the impact of IBMT on mice in terms of pain and suffering. The current IBMT protocols are focused on ease of implementation and often involve large incisions and use large gauge needles that penetrate the patellar tendon. We wish to investigate the effect of current IBMT protocols on the welfare of the animals through behaviour tests and measurements of stress hormones. We also plan to refine IBMT in order to reduce the burden for the animals by such means as using smaller gauge needles, eliminating incisions, and choosing less invasive injection locations. This improved protocol will then be compared to the current protocol to test whether it improves animal welfare.

Once the IBMT technique has been refined, we hope to use it to generate a mouse model of chronic myeloid leukemia (CML). Stem cells injected intra-venously do not seem capable of targeting and colonizing the bone marrow. Using IBMT to deposit the stem cells directly into the bone marrow could potentially improve engraftment and transmigration of the injected cells. A reliable CML mouse model would be a great asset for the

testing and improvement of current CML therapies as well as the development of novel ones.

While IBMT is an important experimental technique, the continued use of the current invasive methods may have many consequences: First of all, it is important for us to reduce the burden on experimental animals whenever possible. Secondly, the stress of unnecessary pain may affect experimental results. This is especially important now that IBMT is being used in cancer models since the invasiveness of the procedure may mask any therapeutic effects under study. The refinement of IBMT may allow us to develop a truly reliable CML mouse model to study potential therapeutics.