One can create “knockout” mice that are missing a specific gene through a process called gene targeting. An investigator created such a mouse for a cell surface receptor expressed by the vast majority of B and T lymphocytes called Mel-14. After creating mice homozygous for this mutation (termed Mel-14-/-), she compared the number of B and T cells in the lymph nodes and spleen in wild type and Mel-14-/- mice. The data are summarized in the Table below.



Recall that lymphocytes recirculate between blood and lymph; and lymphocytes in each lymph node drain into the thoracic duct. To further characterize the Mel-14-/- phenotype, she performed a thoracic duct cannulation on groups of Mel-14-/- and wild type mice and collected and counted the number of thoracic duct lymphocytes (TDL) every 2 days over a 10 day period. Finally, after day 10, all cannulas were disassembled and the number of splenic lymphocytes in these mice determined. The data are summarized in Figures 1 and 2. Data from wild-type mice are shown in open bars; data from Mel-14-/- mice in closed bars.



**What can you conclude from this experiment? What is the reasoning supporting this conclusion based off data?**

**What is a simple mechanistic hypothesis regarding the role of Mel-14 in lymphocyte**

**trafficking that is consistent with these data?**

**What is one more experiment that would explore the validity of this proposed hypothesis. What would be the result you would expect if this hypothesis were correct?**