

## **Understanding the role of Kleisin beta, a subunit of the condensin II complex, in T cell differentiation**

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The research stems from discovering a mutant mouse strain, called “nessy”, which has abnormal T cells. T cells are white blood cells critical for fighting infections and cancers. After many years of work, we were able to identify the mutated gene causing this white blood cell problem. To our great surprise, the gene (called kleisin  $\beta$ ) is found in all cell types, and is important for chromosome structure and for cell division. We were able to prove that a single mistake in this gene caused the abnormal T cell problem in nesy mice. The aim of our research work during the current project is to identify which other proteins interact with the kleisin  $\beta$  protein. This will allow us to understand how the mutation disrupts cell development.

The work is related to understanding the molecular causes of cancer in the following ways: First, cancer arises due to the failure of the immune system, particularly T cells, to recognise cancer cells as foreign. Our work involves studying defective T cell development and function. Second, cancer arises due to defective cell division. The mutated gene we have identified is important for cell division, and reduction in the level of the protein has been shown to cause errors in chromosome separation during cell division. These sorts of errors are common in many types of cancer. Lastly, three other proteins already known to interact with kleisin  $\beta$  have been implicated in human cancers, including breast cancer, prostate cancer and pyrothorax associated lymphoma.

With the funds provided by The Cancer Council, we have recently started experiments to identify novel kleisin  $\beta$  interacting proteins. These experiments will continue over the next 10 months. We hope to have generated exciting results for the next annual report.