# RDLP 673 - PI3K Mouse Model for Breast Cancer

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## Technology description

## Description

The present innovation relates to the development of a novel mouse model for breast cancer and other cancers. Investigators at SickKids have used the ROSA26 loxP-stop-loxP system to knock-in various alleles of PIK3Ca, including the wild type gene as well as mutants that are commonly found in human breast cancer. These mice can be used to induce activated PIK3Ca in any tissue or cell type simply through expression of the cre recombinase. When mice with either PIK3Ca $^{E545K}$ or PIK3Ca $^{H1047R}$ allele are activated with MMTV-Cre, they develop mammary tumors. These tumors are similar to some forms of human breast cancer and can therefore be used in translational and preclinical studies. In addition, these mice develop spontaneous hamartomas, likely in response to activation of mutant PIK3Ca. This model is likely to represent and excellent system to probe processes that lead to recombinationin vivo.

## Background

Cancer genomic studies have shown that the phosphatidylinositol 3’ kinase pathway is activated in most human breast tumors. PI3K activity generates a powerful second messenger, phosphatidylinositol-3,4,5-triphosphate (PIP3). PIP3 promotes proliferation through activation of multiple cytoplasmic signaling proteins, one of which is the conserved serine/threonine kinase Akt1 which affects the mammary cell hierarchy.

## Advantages

This mouse model is a highly valuable platform for translational research and preclinical studies of breast cancer. Specifically, this model can be used: a) to test therapeutics for breast cancer; b) to understand tumorigenic mechanisms; c) to probe processes that lead to recombinationin vivo.

## Institution

The Hospital For Sick Children

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