



Gene Expression Mapping Using Synchrotron Light

GEMS is a novel synchrotron imaging technology conceived at the University of Saskatchewan. It uses hard X-rays to detect heavy (high Z) elements in living things. For example, by linking a gene of interest to the sodium iodide symporter, gene expression can be visualized and temporal expression followed in living animals by mapping iodine.

GEMS can be used to follow the growth of tumors, monitor the effect of drugs or environmental stress on gene expression, track the movement of stem cells and all of this in living animals.

In parallel with GEMS, iodine and other elements are localized in preserved tissues using X-ray Fluorescence. This technique permits the mapping of elements in human and other large animal tissues and requires no genetic manipulation of the samples.

The goals and objectives of GEMS are:

- Develop and test GEMS technology.
- Develop and test element-specific mapping technology
- Improve X-ray detector technology.
- Increase synchrotron-based research in Medicine and Biology.
- Develop collaborations with researchers across disciplines from across Canada.
- Develop GEMS for use by industry.

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