Breast cancer: Do contaminants conspire with tumors?

RACHEL VIAU- MSC STUDENT

Although breast cancer is among the most common cancers in North America, there are not enough relevant human study models representing this type of cancer. To overcome this, we have developed a new and accurate study model with high potential for toxicology studies.

Centre INRS–Institut Armand-Frappier

Breast cancer?
New technical approach

ESTROGENS MIGHT PROMOTE THE GROWTH OF BREAST HORMONE-DEPENDENT CANCER TUMORS. THIS INTERACTION MAY ALSO BE AFFECTED BY EXTERNAL FACTORS WHICH CAN REDUCE OR ACCENTUATE THE HORMONES' EFFECTS, BUT ONLY SOME MODELS RECREATE THEM PRECISELY FOR ACADEMIC AND INDUSTRIAL RESEARCH. OUR NEW MODEL REPRESENTS THIS TYPE OF CANCER AND WILL HELP UNDERSTAND HOW ENDOCRINE DISRUPTORS, MOLECULES ABLE TO MIMIC HORMONES, CAN INFLUENCE ITS DEVELOPMENT.

We are exposed to a variety of compounds with endocrine disrupting properties at different levels depending on our environment and diet. Our new model will give the possibility of unraveling the mechanisms used by these compounds in order to influence the development of hormone-dependent breast cancer.

Choosing the best model for research

Only a few research models for breast cancer are able to recreate the particular interactions of the hormone-dependent cancer, whether cellular or animal models, since they are often too simplified.

In our laboratory we have developed a new model using two types of human mammary gland cells. They play the role of the main actors of hormone-dependent breast cancer: cancerous cells who form the tumors and in the other part, the cells who produce the hormones. By having them grow together, these cells recreate the hormone-dependent breast cancer *in vitro*.

For the improvement of animal welfare

By using two different cell lines, our model aims to reduce the use of animals for toxicological risk assessments. Improving animal welfare is essential and encouraged by a growing number of government and private organizations. This initiative is governed the three Rs, which are aimed to refine, reduce and replace animal experimentation. The ultimate goal relies on the replacement of animal models' usage in research and industry by alternative models such as ours.

"Hormone-dependent tumors are boosted by the presence of hormones !"
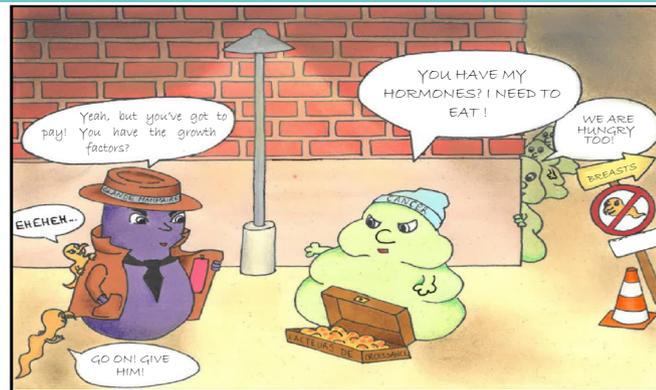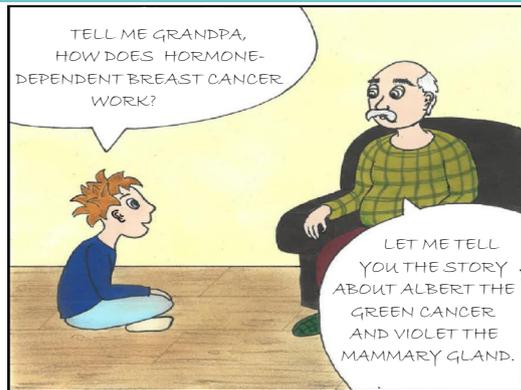
My project in a nutshell

The goal of my project is to develop a new representative model for a hormone-dependent breast cancer. What to do with this new model? Our laboratory will use it as a mean to test the effects of environmental contaminants and other molecules of interest over the endocrine system.

We look forward to unravel how the endocrine disruptors in our environment can influence the development and the progression of hormone dependent cancer. The development of our new model is a follow up in the research I have been participating for the last 4 years.

-In 2017, 26 300 women were diagnosed with breast cancer in Canada. In United States, 83% of the diagnoses were positive for hormone dependent cancer.

-In 2005, 91 different pesticides were classified either as confirmed or potential endocrine disruptors by different environmental agencies in Europe.

Credit: Amélie Côté

What's new?
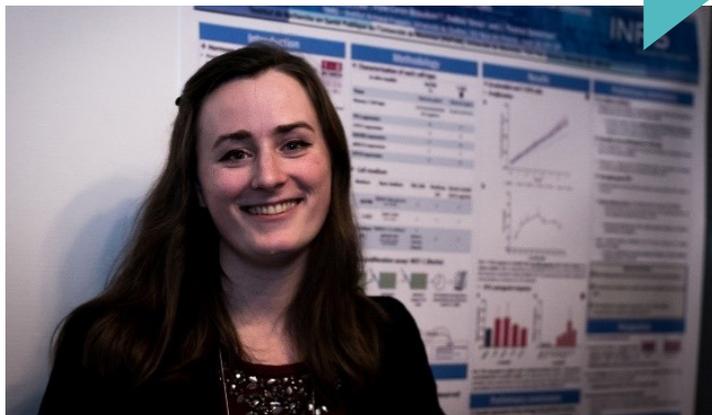
Rachel Viau

MSC STUDENT IN THOMAS SANDERSON'S LABORATORY

I have always been fascinated about life phenomena, with a special desire to prevent them. The work I have done since my first internship in 2014 in Pr Sanderson's team has hugely increased this aspiration.

For my future studies I would love to continue developing on toxicology risk evaluations.

Glossary

Endocrine disruptor: Chemical molecule capable of mimicking and/or blocking the action of hormones in the body.

Hormone dependent breast cancer: Cancer type that is tightly related to an increasing of hormones near the tumors.

The Science Literacy Week

From September 17th to 23rd, teams from Apprentis en biosciences and journal La Synthèse participated to the Science Literacy Week. During this event, they encouraged the general public to discover the many facets of biosciences through reading. For the occasion, some graduate students presented simplified posters of their research at the Bibliothèque Yves-Thériault (Laval).

References

(1) Caron-Beaudoin et al. (2018) - DOI: 10.1289/EHP2698

(2) Animal Welfare Act. 2015; nal.usda.gov/awic/animal-welfare-act

(3) Canadian Cancer Statistics 2017; cancer.ca/Canadian-Cancer-Statistics-2017-EN.pdf

(4) American Cancer Society. Breast Cancer Facts & Figures 2017-2018; cancer.org

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