New research seeks to improve understanding of how breast cancer starts

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Dr Michalak was awarded a highly competitive, four-year career development fellowship from the National Breast Cancer Foundation (NBCF) for her research into breast stem cells. The funding is helping to further her research, which seeks to improve our understanding of how breast cancer starts.

The NBCF fellowship recognises and supports the work of outstanding early-career breast cancer researchers to develop better strategies for diagnosing and treating the disease.

Dr Michalak, a senior postdoctoral fellow working with Professors Jane Visvader and Geoff Lindeman in the institute's ACRF Stem Cells and Cancer division, said the fellowship enables her to progress research into understanding how normal and cancerous cells develop in the breast.

"In the past 20 years, we've seen research make great strides forward in breast cancer diagnosis and treatment," Dr Michalak said.

"However there is no doubt that our ability to improve treatment options is limited by a lack of understanding of how breast cancers initiate and metastasise - or 'spread' - to other parts of the body."

"My research seeks to understand how cells behave in a healthy mammary gland. This will give us clues to identify what is suspicious, and therefore needing further investigation, in the unhealthy - or 'tumorigenic' - setting," Dr Michalak said.

Breast cancer is the most common cancer in women in the developed world, with more than one million women diagnosed every year worldwide.

Dr Michalak said about one in three women with breast cancer will have tumours that become resistant to standard treatments.

"When standard treatments fail, it increases the chance that the breast cancer will relapse and spread to other organs," Dr Michalak said.

"Tumour resistance to treatment is thought to be due to the existence of a small population of cells, which may initiate and maintain the tumour," said Dr Michalak. "These drug-resistant cells are termed breast cancer stem cells, and may originate from normal breast stem cells, " she said.

By studying a group of proteins known as 'epigenetic modifiers' Dr Michalak is hoping to determine how healthy breast stem cells are maintained and how normal maintenance goes 'haywire' in breast cancer.

"In simple terms, the role of epigenetic modifiers in relation to DNA can be likened to that of a director and a movie script. The script can be the same, but the director can choose to eliminate certain scenes or dialogue, altering the movie. In the same way, epigenetic modifiers can instruct and influence DNA to behave one way or another," said Dr Michalak.

"Existing research suggests that certain epigenetic modifiers can influence DNA to increase the cancer cell's potential to spread. By deleting or inhibiting this group of proteins in cells derived from human tumours, I hope to determine if these proteins are important for metastatic disease," she said.

Knowledge gained from Dr Michalak's study will have an important impact on many aspects of the breast cancer field. Long-term outcomes could include the earlier detection of tumours, improved prognostic tools, and better therapies for patients with advanced and metastatic disease.

Source:
Walter and Eliza Hall Institute
