Ingrid Hedenfalk - Summary on Ovarian Cancer Research

Ingrid Hedenfalk, an ovarian cancer researcher, has a master's degree in biology and chemistry. She based her PhD on molecular oncology in Lund University, yet the majority of the research took place in the USA, where she studied for four years; after which she went back to Sweden in order to defend her thesis. She believes that this period was what motivated her to proceed doing research in academia, as opposed to the pharmaceutical industry, due to its freeing environment. Today, she is a professor at the same department where she obtained her PhD twenty years ago.

Hedenfalk previously focused her research on breast cancer, specifically the hereditary types of this cancer, caused by the BRCA1 and BRCA2 genes. However, due to great progress in the prognosis and personalized treatment of breast cancer, she shifted her research topics to ovarian cancer. Because unlike breast cancer, it is a "quite a rare disease, but it also has a very poor prognosis. Thereby the potential progress could make a big impact on individual women's lives", in addition to there being a genetic component. Which are the reasons that motivated Hedenfalk to direct her research into ovarian cancer.

Ingrid Hedenfalk dedicates her research into analysing cells relevant to the ovarian cancer tumour, before and during treatment, to understand differences and similarities within and between patients. Permitting development of effective personalized treatments that can kill the cancer cells.

Tumours, consists of many cell types, in addition to the cancer cells. Thereby the cancer can recruit these cells to facilitate the development of the cancer, but it could also be the body's natural response to something that's foreign. In other terms, it is the activation of the individual's immune system. However, the composition of these cell types is unique within a patient, and may evolve and change in order to survive. In addition to there being cancer cell clones that continue growing and take over, even after chemotherapy. This is the premise of the project.

Hedenfalk's research project's process consists of collecting samples of these cells during surgery from patients that have been diagnosed with ovarian cancer. Then, during the treatment of the patient, further samples of these cells are collected to view how the tumour has responded to the cancer treatment, positively or negatively. Further, Hedenfalk will correlate the analysis of the cells before and during treatment to the tumour response. This process will be repeated multiple times with separate patients analysing whether patients who responded positively to the treatment, do they have something in common? And which cell type is contributing to that? And which cell type is contributing to the patients who resisted the treatments? In order to answer the questions, can we explore treatments that target those specific features (that were previously researched) of the tumour?

According to Ingrid Hedenfalk, this study is made possible by a method called “single cell RNA sequencing, a growing method due to its ability to provide a huge amount of information on an individual cell level”. Previously this method was not applied in ovarian cancer research, specifically not over time for the same patient. Which is the strength of Hedenfalk’s study because “we can follow the same group of patients over time collecting samples as time goes by and learn” to identify a pattern for the causation and development of cancer cells. In hopes of improving personalized treatments. Regardless of this study, Hedenfalk states that “my biggest hope is that we can come up with a good diagnostic test” because when ovarian cancer is found early, and has not spread, then the surgeon and oncologist can very successfully treat and cure the patient.

Professor Ingrid Hedenfalk was interviewed by Elsa Samrud Sage.