

## **Marta Lomnytska**

Marta Lomnytska is associate professor at Uppsala University, a senior consultant, tumor surgeon at Uppsala University Hospital, with clinical, research and translational research focus to ovarian cancer. She completed her medical and doctoral studies, and specialization in oncology and gynecological oncology in Ukraine. She chose to focus on ovarian cancer and embarked on a journey of learning and research. Lomnytska conducted research studies at the Ludwig Institute for Cancer Research at Uppsala University and later at Karolinska Institutet in Stockholm. Her background in gynecological oncology and a desire for a closer connection to clinical needs fueled her interest in biomarkers and tissue analysis. Eventually, her research shifted towards analyzing platelets in blood, considering their importance in cancer development. This natural progression led to the collection and analysis of platelets for her study.

Marta Lomnytska's current research project aims to improve the diagnosis of ovarian cancer, which is a significant challenge due to its difficulty in early detection. She explains that the aspect they are focusing on is understanding the characteristics of ovarian cysts when examined through ultrasound. While advancements have been made, there's still much we don't know about these cysts. It's crucial to understand this for the benefit of patients, treatment planning, resource allocation, and overall patient care. They want to minimize treatment risks and ensure patients receive appropriate care without over- or under treatment. In this study, they are not only analyzing previously identified blood markers but also exploring ways to enhance current diagnostic methods evaluated through ultrasound. Their focus is on markers found in platelets, the small but essential blood cells. Platelets exhibit vigorous reactions during inflammation, chronic inflammation, and cancer. In the case of cancer, they are still trying to comprehend how it spreads. Cancer cells release signals that attract substances aiding their survival, blood vessel formation, and evasion of the immune system. Platelets have been found to provide nourishment to cancer cells, enabling their survival in the bloodstream and facilitating metastasis. Research has shown that cancer patients often have higher platelet counts in their blood, indicating their involvement in cancer progression.

Lomnytska will continue the work with the proteins they previously discovered and analyze the small molecules found in the blood. Specifically, they will study vesicles, tiny bubbles present in the blood that are released by various cells in the body. These vesicles serve as a signature of the ongoing processes within the body. By examining these signatures, they aim to improve diagnostic methods and enhance patient care.

An often-asked question is why recurrence is so common in ovarian cancer, and Lomnytska explains that there are various reasons for this. "One important factor is that the disease is often detected at advanced stages when there are no noticeable symptoms, and it spreads silently. In some cases, not all tumor masses can be surgically removed because they may be located outside accessible areas or beyond the abdominal region. Ovarian cancer is highly

responsive to treatment, but like all types of cancer, it has unique characteristics that enable it to evade destruction. It undergoes specific mutations and changes that act as a sort of alarm system, constantly reprogramming and altering itself. The deeper biological details concerning this phenomenon are still not fully understood, as it remains an ongoing research process to determine why certain patients are highly responsive to treatment while others are less so, and why recurrences occur.”

Lomnytska mentions two challenges as a researcher. Firstly, the constraint of time, with a desire for more time dedicated to research and the ability to focus on other aspects of the work. Secondly, securing funding is a continuous challenge that involves applying to various funding sources and justifying the research, leading to personal development in terms of communication and clarity. Lomnytska also highlights the importance of collaboration with colleagues from different fields, as they offer fresh perspectives and ask relevant questions that may not have been considered otherwise.

Marta Lomnytska’s motivation to continue with research stems from a deep interest in delving deeper into the subject. Patients' questions about recurrences and missed early detections further drive her. With the support of colleagues, previous laboratory experience, adequate funding, and skilled research nurses, she is able to pursue projects and make improvements. The combination of curiosity, accessibility, and opportunities fuels her motivation.

Lomnytska explains that as an ovarian cancer researcher, she collaborates with researchers from other areas of cancer. They work together on diseases that develop in a similar way with cellular clustering and originate from the intestines. In the current study, there is a plan to include patients with other intestinal cancers to understand their origin and spread. They also explore treatment approaches used for intestinal cancer, such as warm chemotherapy flushing after surgery, to test their effectiveness in ovarian cancer. Currently Lomnytska is responsible for the performance of the international multicenter trial OVHIPEC-2 in Uppsala site, one of the 27 participating sites and the 5th leading by the inclusion of ovarian cancer patients for the moment. OVHIPEC-2 investigates if flushing with warm chemotherapy is beneficial for survival of patients with ovarian cancer who undergo primary surgery. Lomnytska emphasizes the importance of collaboration and leveraging expertise in specialized techniques like high-resolution microscopy. The ability to collect unique clinical material with relevant variables and characteristics is crucial for obtaining positive results. Lomnytska also highlights the significance of high-quality clinical material to ensure reliable outcomes in research.

Marta Lomnytska expresses her hope for ovarian cancer research, specifically with her study. She hopes to identify and confirm protein markers that can be detected in new patients, not just those included in the current phase. The ultimate goal is to establish a connection that can determine whether the tumor is benign or malignant. The marker panel will be even explored for the capacity to identify individuals who would benefit most of the warm chemotherapy flushing after surgery. Lomnytska also emphasizes the importance of translating research findings into clinical practice, making it applicable in everyday patient care. She expresses a

general hope for other research studies to discover more medications with biological targets that can naturally and effectively kill cancer cells. Lomnytska is grateful for the support and trust she has received, allowing her to continue her research and gain visibility for further funding and patient engagement. She acknowledges the patient-centered approach of the foundation supporting her work and emphasizes the importance of understanding patients' experiences and well-being.

*Marta Lomnytska was interviewed by Moa Jernberg & Filippa Larsson*