

World Laboratory Day

Interview with Prof. Dr. Georgia Konstantinidou

Prof. Konstantinidou – You conduct laboratory research here at the Bern University Hospital. What are your areas of research?

In my research group, we conduct research in the area of lung and pancreatic cancer. We try to understand what exactly directs the growth of cancer cells and identify their vulnerabilities. We then use these weaknesses specifically to kill cancer cells.

Can you give us an example of this?

Yes, my lab works on the biology of lung cancer and pancreatic cancer. Specifically, this means that we work *in vitro* at the cell and tissue level. We use cell lines with well-known properties and examine tissue samples from patients in the clinic.

Do you also work in vivo on living organisms?

Yes, we do. Nowadays, we try to reduce animal testing to a minimum. However, there is always the situation that necessitates carrying out animal experiments between our findings in the laboratory and research in the clinic, i.e. with patients. These are carried out according to today's strict guidelines and are monitored by an ethics committee.

You are working on the biology of lung and pancreatic cancer. Can you tell us about some of your recent findings?

We are currently focusing on a group of tumors that carry KRAS mutations. KRAS relays signals from outside the cell to the cell nucleus. These signals control growth, cell division and differentiation into cell types with different tasks. Mutated KRAS genes are the most common cause of cancer in humans. However, there are still no drugs that can be used in the clinical setting. Therefore, we are focusing on identifying effective therapeutic targets to prevent KRAS mutations from forming cancer. We recently published a scientific paper on this in "Nature Cell Biology". We found out how KRAS mutations promote the adaptation of cancer cells to hypoxia (oxygen deprivation), which is a typical feature of all solid tumors (PLCγ1 suppression promotes the adaptation of KRAS-mutant lung adenocarcinomas to hypoxia, <https://doi.org/10.1038/s41556-020-00592-8>).

What you are describing sounds like the work of a detective.

Yes, that is one way of looking at it. My team is always trying to clarify new, important questions: How does lipid metabolism influence the development and metastasis of lung and pancreatic cancer? Or: How can we prevent the formation of fibrosis, which makes pancreatic tumors more resistant to therapy? We now understand the development of cancer much better because we have discovered numerous signaling pathways that cancer cells themselves use to grow and metastasize.

This conversation is taking place in part because today, on World Laboratory Day, we would like to highlight researchers and their work in a highly specialized research laboratory. We would be very interested in learning a bit more about you and how you became a professor and head of a research team.

I was born and raised in Greece. My studies took me to Italy, the USA and then to Switzerland. My scientific interests have been in biology since the beginning. During my master's studies, I attended a lecture on cancer biology, which fascinated me immediately and permanently. The topic of my master's thesis was breast cancer. My current position at the Institute of Pharmacology at the University of Bern is a professorship funded by the Swiss National Science Foundation. I was able to build a team here, a very exciting work.

...and what attributes are necessary for someone to be successful in a research lab?

Our work is driven by interest and the willingness to put in extraordinary effort. We also work on weekends and during vacations if an experiment requires it. Work in the field of animal experiments is especially demanding. Further prerequisites are the desire to work with others on the team and with other disciplines, to exchange ideas, and to think beyond disciplinary boundaries. This is key to research work today.

You have landed in Bern. What is it about Bern that distinguishes it as a location?

There are several decisive factors for working in the research laboratory here: First, the proximity to the clinic. We regularly exchange information with surgeons and pathologists. Another factor is the high level of laboratory equipment. We can work here with state-of-the-art equipment, for example, imaging mass cytometry, or digital imaging and analysis.

As we come to the end of this interview, we would like to address the young students. What would you recommend someone who might be thinking about starting a career in a research laboratory?

The work as a researcher is demanding and requires total commitment. In Switzerland, there are many efforts to reconcile work in a research context with a family role, but not all problems have been solved yet. Furthermore, our research work sometimes leads nowhere. There are setbacks and disappointments. You have to be able to cope with that. On the positive side, however, we can cite many reasons to pursue a career in the research lab: We have the freedom to always tackle new topics, and we have the certainty that our results, once successful, will benefit many people and help cure serious diseases.

Thank you very much for sharing this insight

Bern, April 22, 2021, mwy