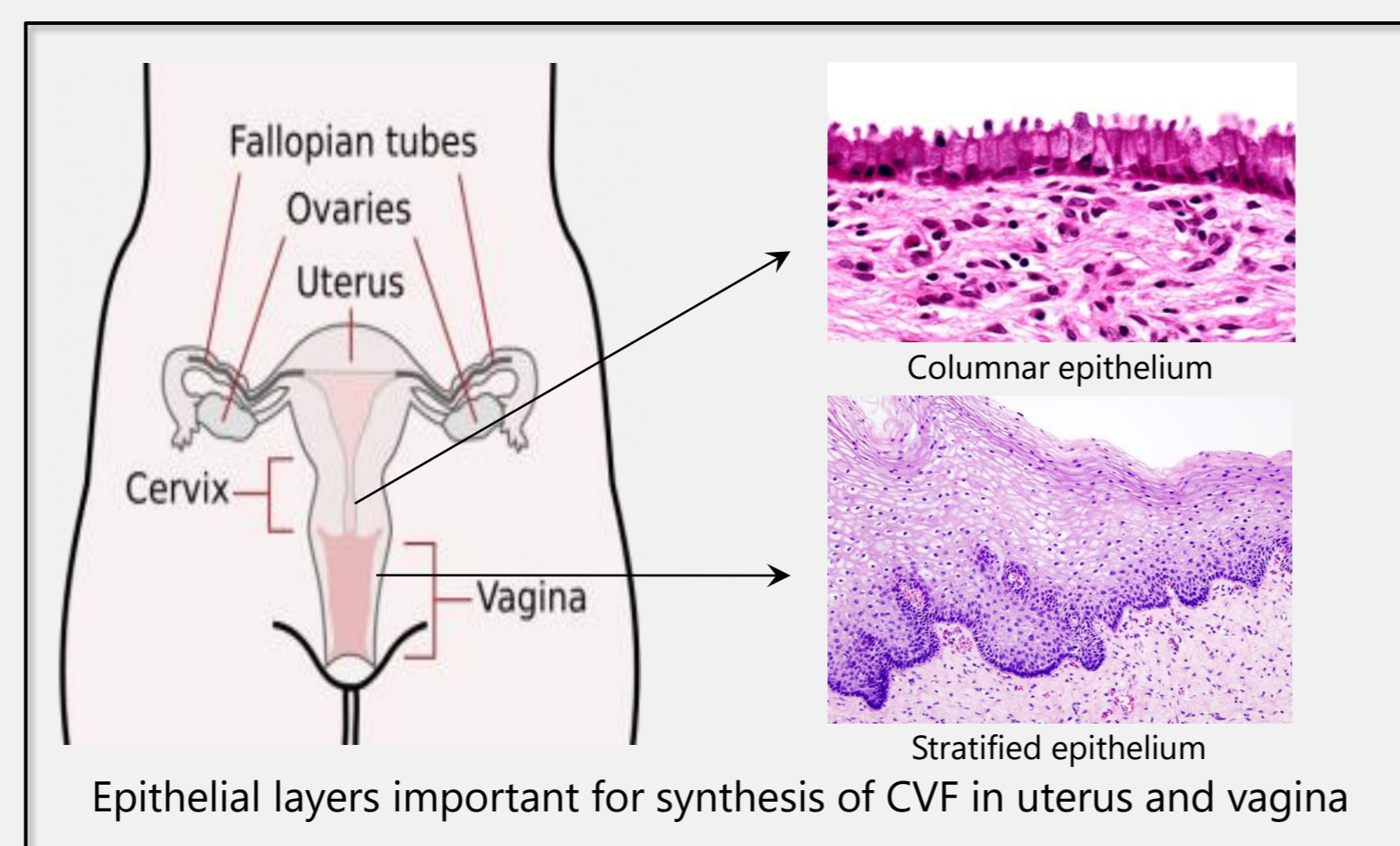


Biomarker research

Biomarkers for cervical cancer in the proteome of the cervical vaginal fluid (CVF)

Research in our lab, such as differential proteomics combined with pathway analysis, learnt us that biomarkers for cervical cancer are present in the human cervical vaginal fluid (CVF). Such biomarkers could in first instance optimize the screening assays, used in industrialized countries such as Belgium. However they could also open the way towards development of a simple assay that could be used by a local practitioner to determine the risk for development of cervical cancer. Especially in low- and middle income countries where it is hard to enroll screening and vaccination programs such a Point-of-Care test would be very welcome.

Analysis of these biomarkers is therefore urgently needed. Next to Western blot analysis we plan to use a mass spectrometric technique (MRM) which enables us to simultaneously quantify several biomarkers in one run (multiplexing) and on many samples.



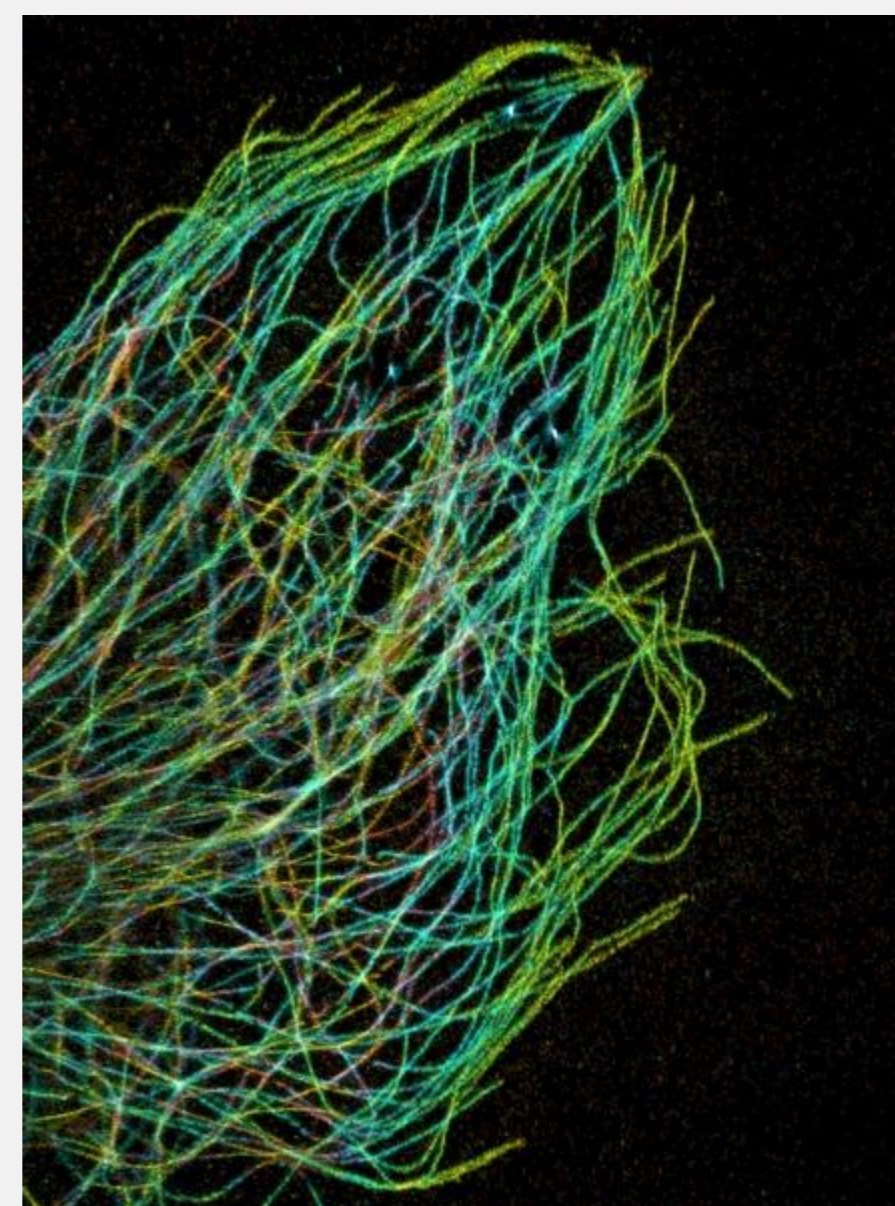
Biophotonic signaling and quantum biology

Explore a big jump in neuroscience: electromagnetic and biophotonic signaling, based on quantum phenomena, in neurons

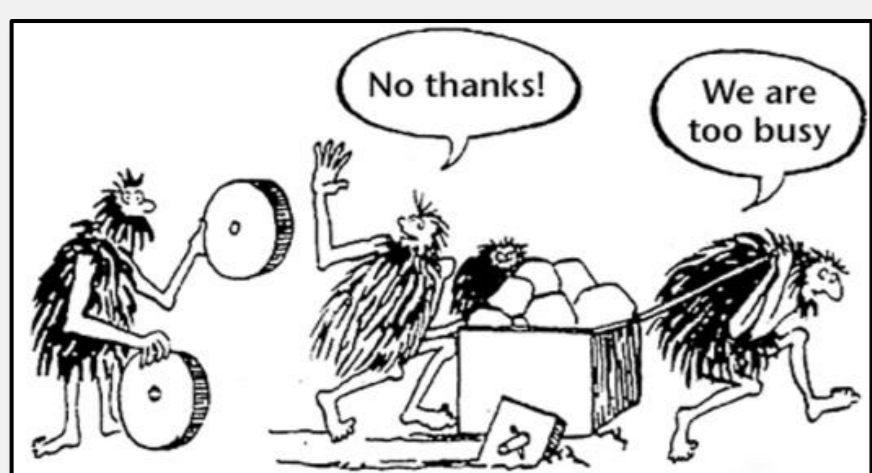
How can the brain coordinate and synchronize overwhelming amounts of activities in short periods of time? Is there a neurological explanation for consciousness? How do we store the enormous amounts of information in our memory? To explain these questions, current scientific explanations constantly fall short, hence a new leap that introduces radically new concepts in neuroscience is necessary.



is necessary.



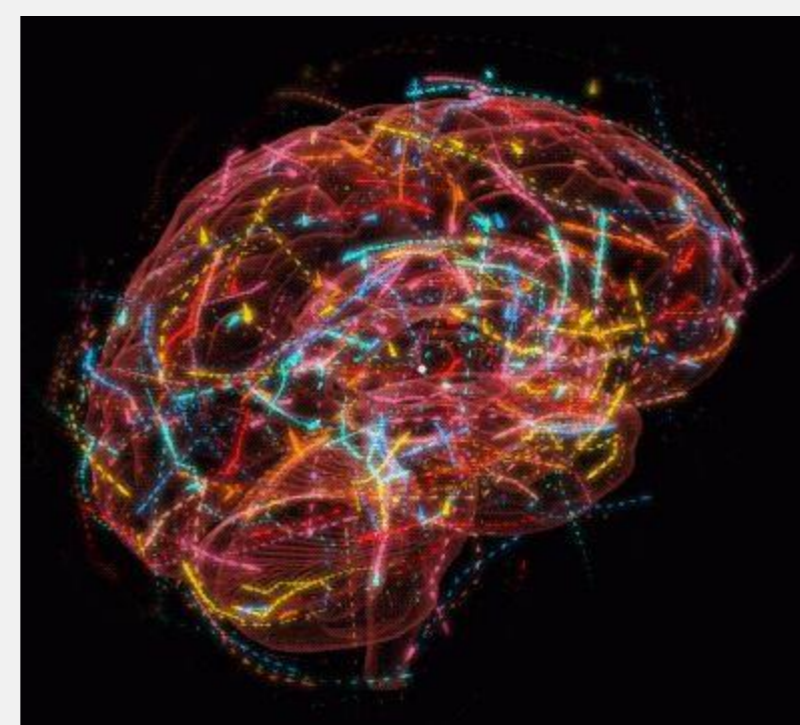
Theoretical (quantum) biophysicists have put forward intriguing models that focus on the microtubular network in cells, yet no *in cellulo* or *in vivo* experiments have been undertaken to confirm this.



And that's a shame: if successful, such results could lead to a drastically new concept whereby neuronal communication not only

involves membrane but also microtubule electricity.

And even more: bringing in the laws of quantum physics into neurology introduces phenomena such as entanglement (two particles are inextricably linked, regardless of how far apart they are) and quantum superposition (a quantum system can be in two different states at the same time), two phenomena that are very well suited to explain the synchronic neuronal actions that form the basis for higher brain functions.



The proteomics group from the PPES cluster wishes to explore these theoretical models in a cellular environment by performing proteomics experiments on neuroblastoma cells that express mutant tubulin proteins or are exposed to magnetic fields.

Withaferine A and anti-cancer research

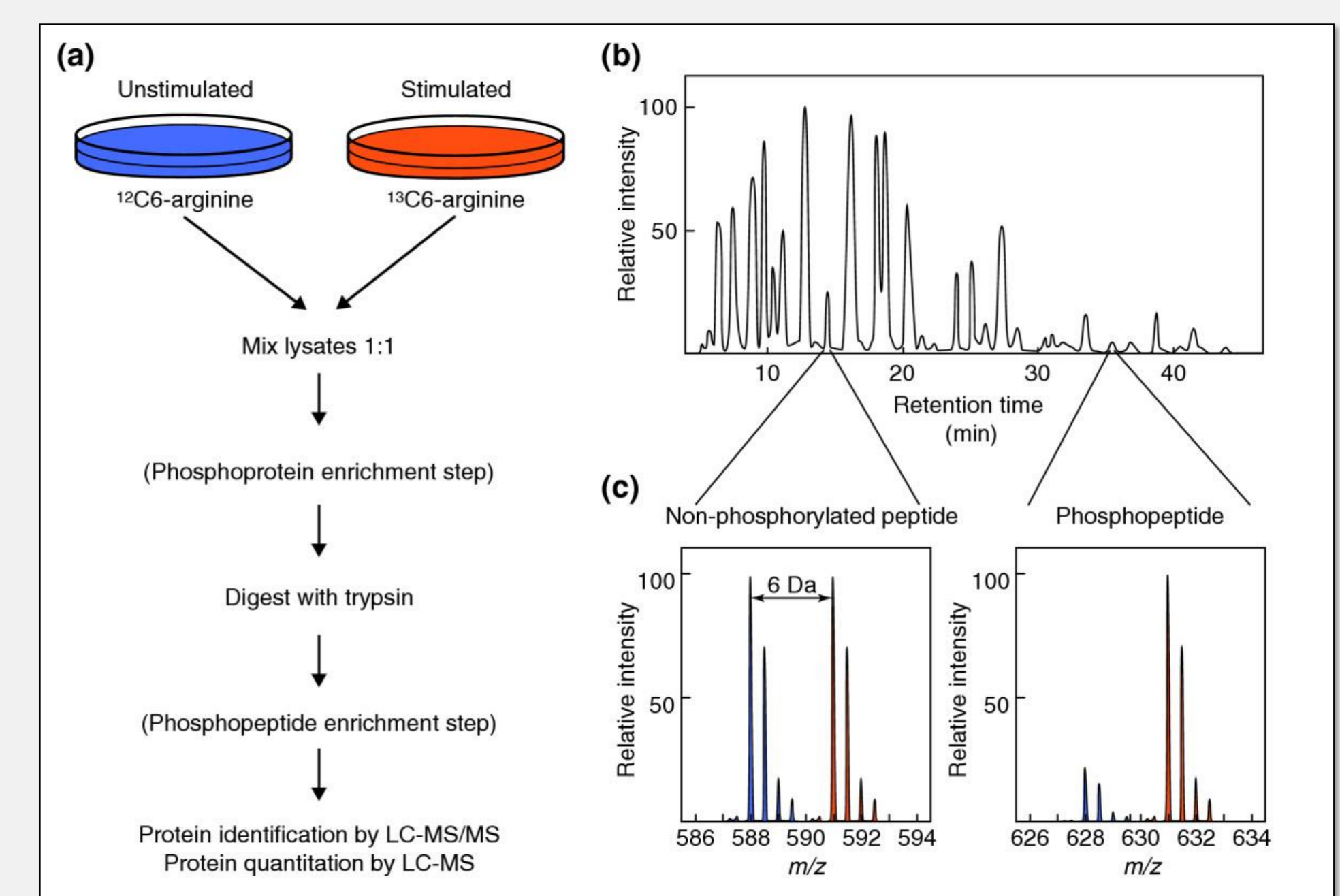
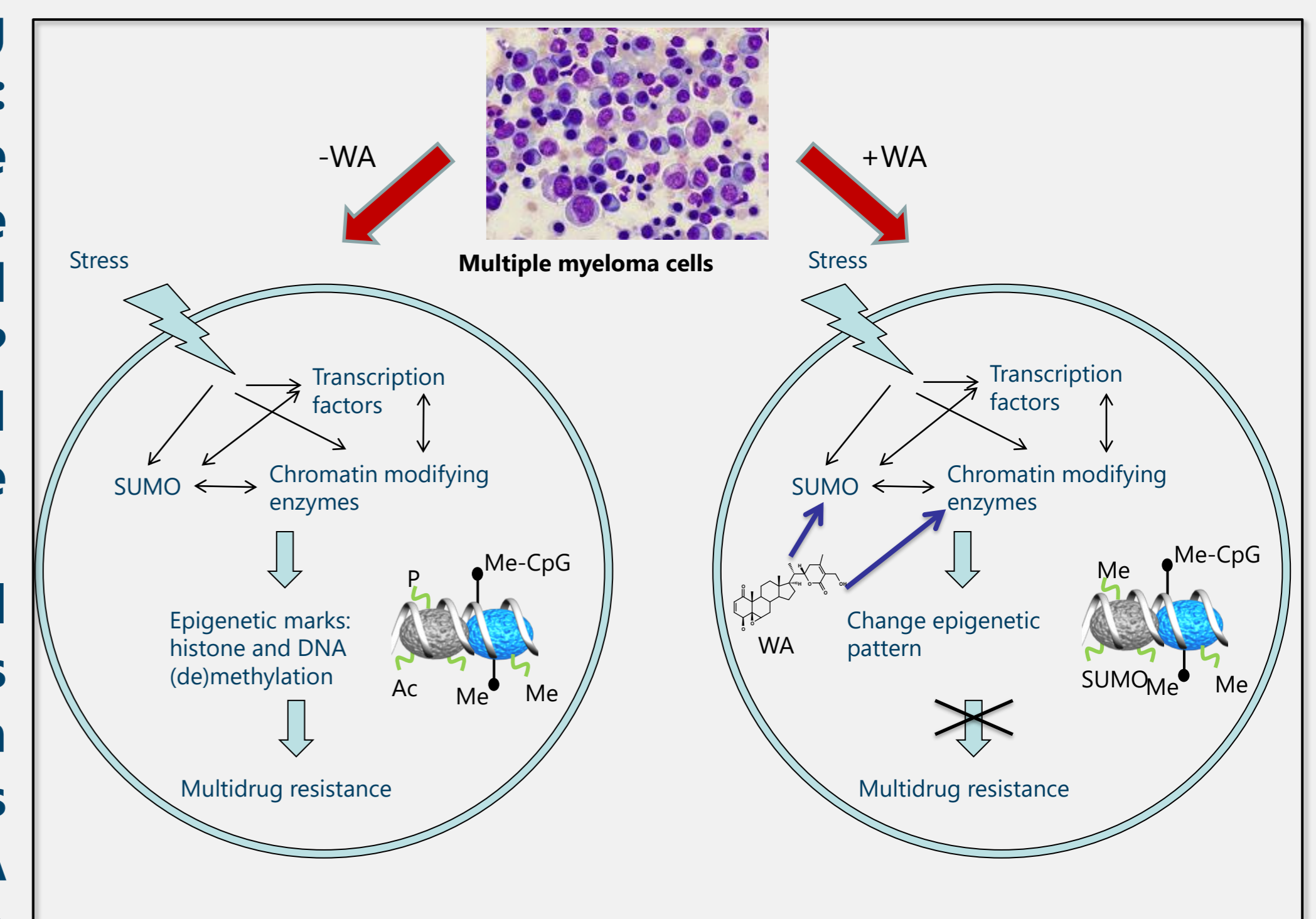
Dissecting the molecular mechanism of the antitumoral plant compound Withaferine A by means of proteomics

Withaferine A is a compound extracted from plants which shows several beneficial medicinal effects such as anti-angiogenesis, anti-inflammatory and antitumor activity. Research in the PPES lab showed that the compound binds a wide variety of proteins, many of which are involved in different pathways.

We therefore are asking the following questions: which proteins are important for the antitumor activity and how are they regulated? Which post-translational modifications play a role in its mechanism?

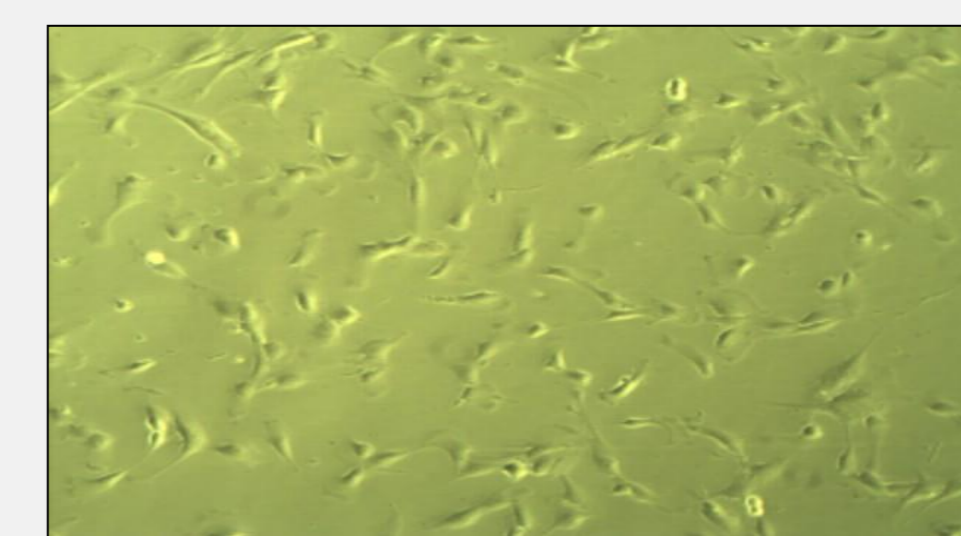
To answer this, several differential proteomics strategies will be used in order to find differences in Withaferine A susceptibility between several cancer types.

This research could not only provide us with a better insight into the mechanism of cancer, but the identification of proteins that could be targeted in antitumor therapies may lie the basis for a new class of antitumoral compounds with optimized action.



Techniques

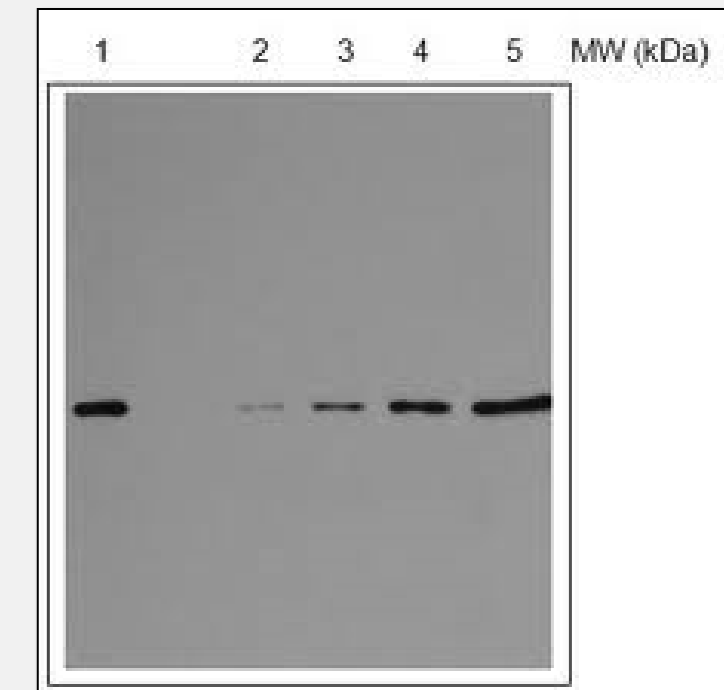
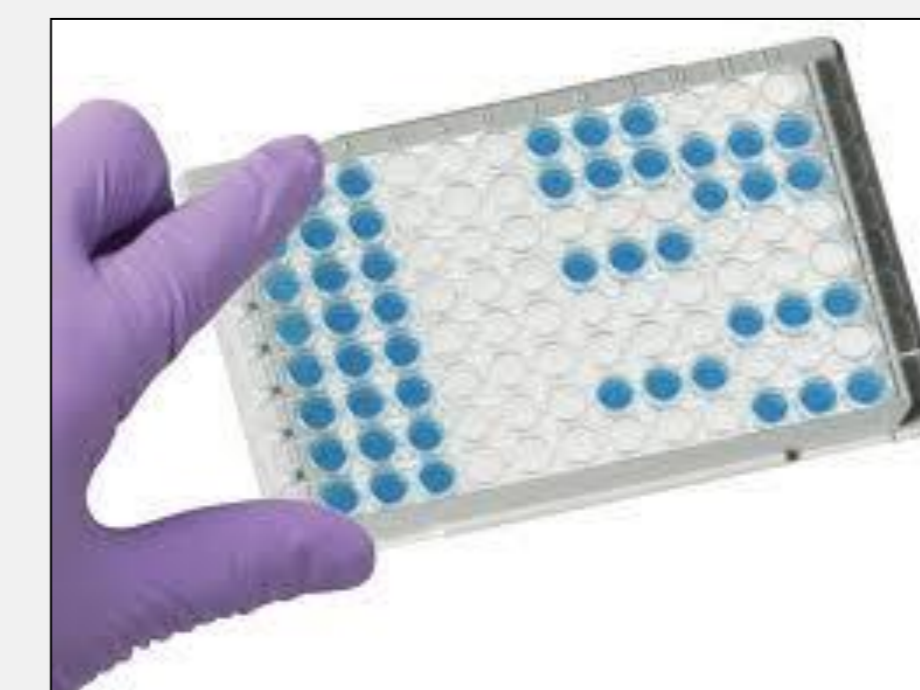
Cell culture



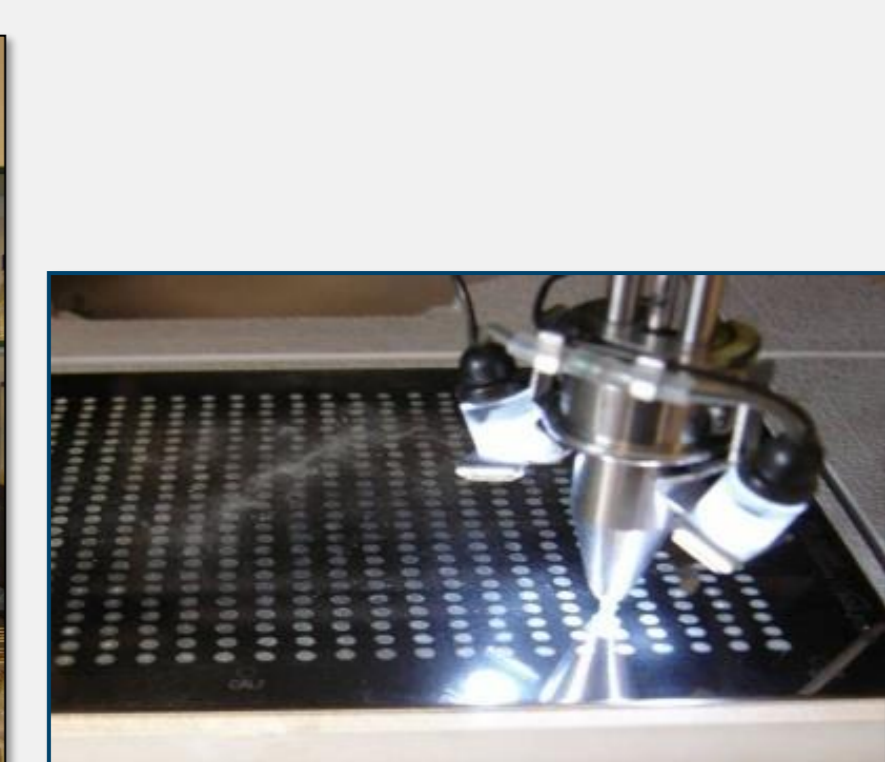
Protein purification by affinity chromatography



ELISA and Western blot analysis



Normal, capillary and nanochromatography

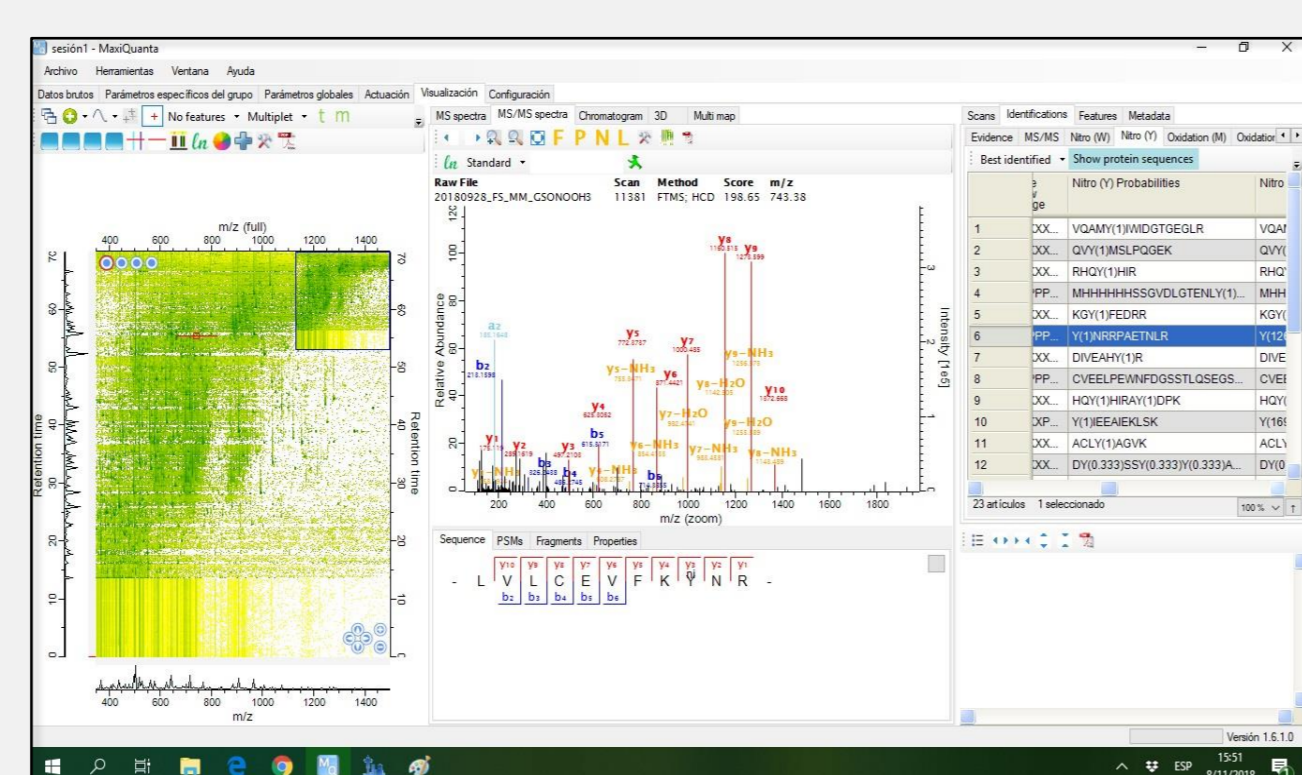


Mass spectrometry:

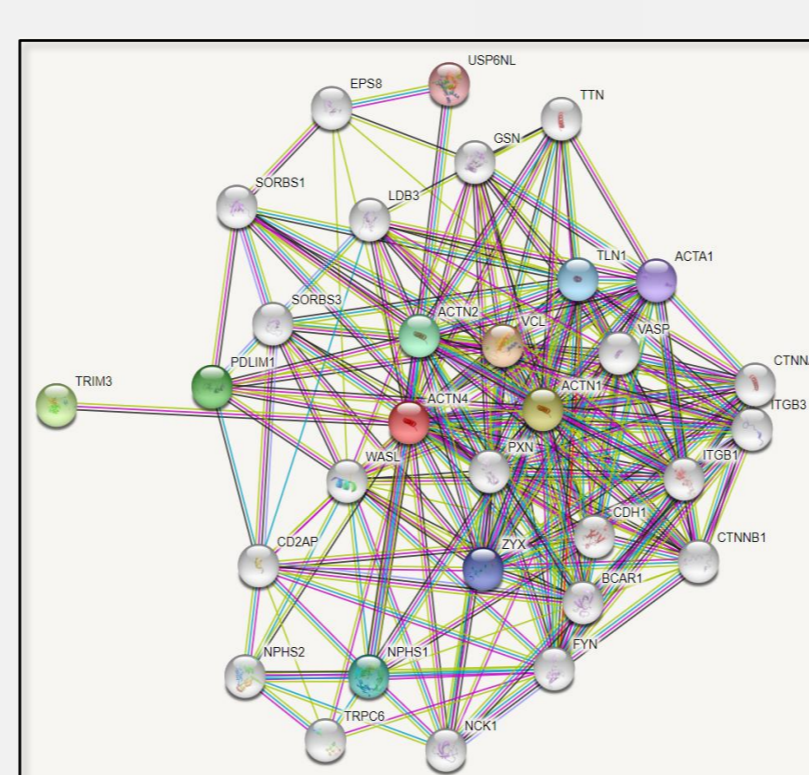
• Orbitrap QExactive

• QTOF

• Triple Quadrupole



Data analysis



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