Gergana Popova and Nicolas Fritz' Search for Cancer Treatments Using Cytation 5

At the Department of Microbiology, Tumor and Cell Biology at the Karolinska Institute in Stockholm, Gergana Popova and Nicolas Fritz do research on the p53 protein to discover better cancer treatments. For this, BioTek Instruments' Cytation™ 5 along with the BioSpa™ 8 have proven to be extremely useful to both research teams.

By Sine Bak Hansen, AH diagnostics

Extensive focus on the p53 protein

The Karolinska Institute is a massive place of knowledge and research. Gergana is a PhD student and works with Professor Sonia Lain, and Nicolas is a Senior Research Specialist with Professor Sir David Lane's research team. Both are part of the Department of Microbiology, Tumor and Cell Biology where they do basic research on tumor biology to find new drugs to treat cancer.

Common for both Gergana and Nicolas is that they are interested in one particular protein, p53. They each research this important protein differently. Nicolas explains the reason behind his research: "P53 is a very important transcription factor for cell and/or organism survival; it is also the most mutated protein in cancer. Around fifty percent of cancers carry mutations in TP53, the gene encoding p53. It is thus a very important protein for protection against cancer and we want to find new ways of activating it in the type of cancer where this could be therapeutically beneficial."

> "Basically, we are trying to treat cancer using the p53 protein." - Nicolas

Gergana tells about her team's research on the p53 protein: "We are trying to find molecules that can be used as therapeutic drugs for treatment of cancer. By screening for p53 activators, we have found interesting molecules that are inhibiting an enzyme called dihydroorotate dehydrogenase, DHODH. DHODH is part of a pathway for synthesizing some of the building blocks of DNA and RNA. Modifications of these activators can lead us to molecules we can base treatment on." When a drug is discovered, testing begins to improve it for cancer treatment.

Two teams, many different needs, one extremely versatile instrument

The Cytation 5 is a multiplex platform and is used for cytotoxicity experiments in adherent cells or spheroids, and it is used by both research teams. Nicolas describes how the instrument

Nicolas Fritz

fits in their workflow: "Depending on the experiment, we grow cells in the wells of 24-, 48- or 96-well plates. Being able to choose is a nice feature, although we most often use 96-well plates. We then treat the cells and run them on the Cytation 5 to observe them over a period of time, which can be very long. The instrument can handle several people working on it at the same time which is essential to us because it would otherwise mean that we would have to run fewer experiments; and that would get us nowhere."

It is possible to use different objectives and channels (bright field/phase/fluo), depending on the assay. The recordings take place over days or weeks, and new recording are usually started every few hours. The possibility to use different objectives and channels is exploited to the fullest as Gergana and Nicolas use the instrument for very different purposes.

Nicolas explains that he has mostly used the instrument for fluorescence and imaging: "I have now started working with tumor spheroids experiments, so instead of suspension or monolayers of cells you grow your cells together to make a little tumor in the dish. You observe how it builds up and how it breaks down with different treatments."

> "It really is a great system for performing experiments in many plates and wells at the same time. Especially because you can look at many different phenotypes simultaneously while multiplexing." - Nicolas

Nicolas elaborates on his appreciation of the instrument. "Part of the reason we acquired this system, is that it is very versatile. While I'm mostly making use of the fluorescence and live imaging abilities of the system, the versatility of the system is really exemplified by how Gergana works with the instrument, which are for completely different purposes.

Gergana explains: "For my experiments I have used the imaging mode of Cytation 5 to do microscopy. I work with already fixed cells, so it's just staining and not live cell imaging." Although her needs change, the instrument is still perfectly usable in her research. "I'm now using the fluorescence part for imaging, and for plate reading I mostly do absorbance. I also know that some of my colleagues are planning to do experiments with luminescence. It is really amazing how versatile and easy to use the instrument is despite having so many possibilities and features."

> "The software is extremely user friendly, and I really like that." - Gergana

Pairing the Cytation 5 with the BioSpa 8 for even more features

One of the reasons the research groups invested in a Cytation 5 besides its versatility, is that it has the ability to be paired with other instruments like plate washers, dispensers and of course BioTek's BioSpa, turning it into an autonomous automatic system. Gergana explains how easily this is done: "Basically, you just ask the instrument to do your work. You just put your plate into the BioSpa 8 for incubation for the required amount of time. Then, with easy programming, you decide when you want the plate to be read or imaged by the Cytation 5. This is really great and makes this step of the workflow so much easier for me. Ultimately, we want to couple our Cytation 5 to a washer dispenser, which will allow even more automation."

> "Without the BioSpa 8 and the multiplexing possibilities it would have put some very unfortunate restraints on our research. The versatile system really helps all of us with our many different needs in our daily research." - Nicolas

Besides coupling the instrument with reading of absorbance and luminescence, to Gergana, an important feature is the ability to pair it with a proper microscope that is easy to handle, especially useful if you are not a microscopy expert. She explains: "I haven't done imaging with classic microscopes and I can say that you can get quality images and still get very good data with Cytation 5 without needing extensive training. However, when I needed any kind of support, help has been quick and extensive."

The Cytation 5 is also easily paired with the BioSpa 8 Live Cell Analysis System, which both Gergana and Nicolas have used to do cytotoxicity and scratch wound assays, even though it is still a rather new feature for them. Nicolas explains: "We are using the BioSpa 8 more and more now. It has been a little hard to get started up with the system, because we have moved location and we have lacked the time to get the system up and running properly. However, it has already proven to be very valuable for us."