

Extensive experiences in using next-generation sequencing platforms

Heads from the Profile Areas – Molecular Biologist Dr. Vladimir Despic

Goethe University Frankfurt's scientific excellence is bundled in six Profile Areas that make up its research profile, which conduct research on important questions and topics of our time. But who are the people behind them? To find out, we have put together a short survey for Profile Area researchers – like Dr. Vladimir Despic: A senior scientist, he belongs to the international team «RNA Regulation in Higher Eukaryotes» working at the university's Institute for Molecular Biosciences. The group is part of Goethe University's SCALE excellence cluster initiative, which investigates the choreography in which molecules self-organize to conduct complex cellular functions.

GoetheSpektrum: What do we need to know about your research project?

RNA molecules in our cells represent specific combinations consisting of four nucleotides: A, G, C and U. Each of these nucleotides can be enzymatically modified by many chemical groups to expand the RNA alphabet from four to over 100 new RNA building blocks, known as modified nucleotides or RNA modifications. Mutations in enzymes that create modified nucleotides in RNA are often implicated in the development of many human diseases. I study how modified nucleotides change the physicochemical properties of RNA to regulate RNA fates in the cell and how this type of RNA regulation is molecularly linked to human diseases.

How did you come up with your topic?

A major roadblock for understanding the functions of RNA modifications is the lack of methods to easily detect and quantify them in an RNA. During my career, I have gained extensive



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experiences in using next-generation sequencing platforms for the quantitative assessment of RNA abundances in the cell. I can now adapt these methodologies to quantify RNA modifications and study their roles in RNA regulation.

How do you conduct your research?

Finding out where modified nucleotides occur within the RNA is often the first and rate-limiting step in understanding how they affect the RNA lifecycle in our cells. I primarily develop cutting-edge quantitative methods that can provide us with the positional information of modified nucleotides in all expressed RNA molecules inside a cell. I do this by combining chemistry and biochemistry with next-generation sequencing technologies.

Who do you exchange ideas with?

I exchange ideas with my colleagues at work and at conferences. I also have many friends who are scientists from different research areas. We often bring fresh perspectives about each other's projects by giving insights from our own fields.

Beyond science, what else are you passionate about?

I like modern art, traveling and spending time with my friends and family.

Interview: Pia Barth

Vladimir Despic is a member of the international team «RNA Regulation in Higher Eukaryotes».