DESCRIPTION FOR THE GENERAL PUBLIC

Human body is built up of billions cells. Some of them are able to conduct electricity and are responsible for mental processes. Other take part in the defense of our body against bacteria and viruses, and still other allow us to work physically. The information about their construction is encoded in DNA and each cell has the same genetic information. Single cell that store encoded in DNA information about the construction of whole body does not use all of this information at the same time but only this part that is currently necessary. The selectivity of information transcribed from DNA determines not only the diversity of individual cells but also organs such as the eye or ear. The DNA molecule has very compact structure. Human DNA molecule has 2 m length and must fit into the nucleus with approx. 6 micrometers diameter, that is 0.006 of mm. To make this possible, the DNA in eukaryotes is compacted together with proteins called histones and resembles a string of beads. Such a string of beads called chromatin forms more complicated structures what further allows to compact DNA better. In order to decode the information from DNA, there must exist very sophisticated tools that allow to do it. Such tools are chromatin remodeling complexes. These specialized proteins complexes allow to reach the most entangled, remote fragments of DNA strands. Reading (transcription) and decode the same DNA information can give more than one result. This means that from one DNA fragment it is possible to receive several different variants of the edited information. Such reading of the same information in several ways is called alternative transcription. Alternative transcription is one of reasons for cell and organ diversity.

Researchers have verified that in both human and in a plant commonly used as an object of research in molecular biology – Arabidopsis, complexes that remodels chromatin can be involved in different reading of the same information encoded by the DNA.

In this project, we plan to investigate a new hitherto unknown role of the chromatin remodeling complexes in different reading of the same information encoded in the DNA of various cell types and the impact of these complexes to choose of different start site for reading information, encoded by the same DNA fragment.

The results obtained during this project will significantly expand current knowledge about a new hitherto unknown role of complexes that remodel chromatin structure in choice of the various start sites of reading information encoded by the DNA fragments and its organ specific dependence on the selection.

The expected results will also be used for science popularizing, to construct new scientific projects and as a basis for PhD thesis and in habilitation procedure of the project Principal Investigator.