Emmy Noether funding for research into drug resistance of blood cancer

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) is funding a new Emmy Noether junior research group at the German Cancer Research Center (DKFZ) for six years with a total of around 2 million euros. The scientists and doctors, who are part of the Clinical Cooperation Unit for Pediatric Leukemia at the Hopp Children's Cancer Center Heidelberg (KiTZ), are using a new procedure to investigate how cancer cells manipulate the formation of proteins to become resistant to cancer drugs. The method and the newly gained knowledge are also to be used for the development of better treatments for childhood leukemia.

Leukemia is one of the most common cancers in children, affecting about 30 percent of young cancer patients. Even though the disease is now easily curable in most children, about 10 - 20 percent relapse because the cancer cells have become resistant to the usual drugs. This means that the disease can no longer be stopped by standard therapies.

An important role in the development of resistance in leukemias and many other cancers is played by processes of protein formation, which will be intensively researched in future by a research group at the Hopp Children's Cancer Center Heidelberg (KiTZ) and at the German Cancer Research Center (DKFZ), led by Ashok Kumar Jayavelu. Only recently, a research team led by Jayavelu was able to make the crucial discovery that tumor cells manipulate protein production in such a way that they become resistant to treatments.

The cellular mechanism underlying this, which the research group will also examine more closely in the future is called "splicing". Splicing is an essential step for the cell to prepare a transcript of genes that is cut to the right version and then transported within the cell to the place of protein production. The blueprint provides the instructions the cell needs to assemble the multiform proteins of a cell. The process is controled by the "spliceosome", a highly complex protein structure that is in constant remodeling as it works. "We now know that mutated splice proteins are common in leukemia cells," Jayavelu explains. "However, the assembly of the spliceosome is an extremely dynamic and highly complex process involving more than 150 proteins. Identifying which factors and structures are responsible for the development of blood cancer and possibly also the formation of resistance is therefore a major challenge."

Jayavelu's team has developed a special mass spectrometry method to examine proteins and their modifications. In particular the researchers will apply this in cancer cells to study the splicing process. Establishing this method at the DKFZ is the goal of the new Emmy Noether junior research group, which is funded by the German Research Foundation (DFG) with around 2 million euros. Jayavelu is also the head of a research group at the KiTZ to use the method to research the causes of resistance in childhood leukemia. This therapy resistance is particularly pronounced in the case of so-called acute lymphoblastic leukemia in children, ALL for short. "With the new method, we hope to soon better understand the causes of this so that we can also help children who have relapsed," says Jayavelu.

Press release

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Source: German Cancer Research Center (DKFZ)

Further information

- German Cancer Research Center (DKFZ), Heidelberg