Looking for the Link Between INI1 and Cancer

Atypical Teratoid/ Rhabdoid Tumor or AT/RT is a pediatric cancer, which is found primarily in the brain of children. Typically, the children with this cancer are between the ages of 6 months and 3 years old. Because very little is known about this cancer, the prognosis of these patients is not good. Less than 20% of these patients will live for longer than two years. And those who do live longer than these two years typically suffer from a lifetime of problems due to exposure to radiation at too young of an age. This exposure of patients to radiation is performed despite the physicians knowing future problems are a strong possibility. Unfortunately the radiation is necessary because not enough is currently known about AT/RT to find better treatments for it.

Currently multiple researchers are studying the link between a protein called INI1 and the presence of AT/RT. The difficulty with determining a link between INI1 and AT/RT is largely due to the fact that very little is currently known about INI1. Characterization of INI1 is something Dr. Ruhl’s lab is focuses on. Due to the fact that not much is currently known about INI1, any new information about it could help to determine its function. Learning the function of INI1, could then help other researchers learn about why the AR/RT forms. Once they learn these pieces of information, a more effective treatment method could potentially be developed.

One experiment performed by Dr. Ruhl was titled “A Role for BAF57 in Cell Cycle–Dependent Transcriptional Regulation by the SWI/SNF Chromatin Remodeling Complex” (Nasun et al. 2010). During this study, the researchers were looking at BAF57 which is in the same family of proteins as INI1. BAF57 functions to help the cell move through the individual cycles necessary for the cell to divide. It was found that in the absence of BAF57, there were many different changes observed. Some of these changes included: 1) It did not allow the cells to move throughout all of the necessary cycles. Instead it caused cells to all stop at the same cycle. And 2) Changes the composition of the complex, called SWI/SNF, necessary to produce INI1. Overall, this study helped to show how the subunits in the SWI/SNF can change something as major as the ability of the cell to reproduce. In a discussion with Dr. Ruhl, he explained that INI1 and BAF57 are both part of the SWI/SNF complex. As individual proteins they perform specific functions, but work together in their complex to perform a different overall function. He said “SWI/SNF is like a fraternity, which INI1 and BAF57 are members of. As a whole, the fraternity works together, but they also work individually on their own projects.”

Once researchers succeed in characterizing INI1, they can hopefully use those results to substantiate a causal relationship between INI1 and AT/RT. These findings would then be used in other labs around the country who are focused on finding treatments. Hopefully, these researchers will be able to collaborate their findings in the near future in order to change the outlook for patients with AT/RT by creating new treatments.

References

Nasun, H., A. Kolkman, D. D. Ruhl, W. W. M. P. Pijnappel, A. J. R. Heck, H. T. M. Timmers, and W. L. Kraus. 2010. A Role for BAF57 in Cell Cycle-Dependent Transcriptional Regulation by the SWI/SNF Chromatin Remodeling Complex. Cancer Research:4402–4411.