A Novel Approach to a p53-Stabilizing Agent to Accelerate Cell Apoptosis and Initiate Cell Arrest and Curb Malignancy of Tumor Cells

Ali, Syed Roshan (School: La Martiniere for Boys, Kolkata)
Dasgupta, Shuvayu (School: La Martiniere for Boys, Kolkata)

Cancer is a major public health problem and is the second most leading cause of death worldwide. Today, treatments available to us include chemotherapy and surgery which are both vastly expensive processes and have numerous side effects. Cancer is caused by mutations (both, somatic as well as hereditary). When such a mutation occurs, cells in our body start dividing uncontrollably and hence cause tumors. In our project we have focused on a tumor suppressor protein known as p53, which transcribes from the TP53 gene. This protein (p53) is also known as the ‘gate-keeper’ of the cell as mutations in this protein itself cause about 50% of all observed cancer cases. Mutations are random and chance dependent, yet some mutations are observed more frequently than others. These mutations are known as hotspot mutations. We have researched on two such hotspots. We have used a drug known as CP-31398 which binds to the mutant p53 and by reverting the mutant conformation back to the wild type conformation, it reverses the effect of this mutation, hence causing mass apoptosis and curbing malignancy! We have tested this drug on various cell lines and also on stem cell primary spheres having different p53 status (mutant/wildtype). We have also done experiments to check the combined effect of CP-31398 along with Doxorubicin taking suitable controls too as required.