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ANALYZING SHMT2 ENZYME TO INHIBIT CANCER CELL PROLIFERATION

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Abstract: My research project focuses on the function and analysis of an enzyme called Serine Hydroxy methyl transferase (SHMT), more specifically SHMT2. This particular enzyme is located in the mitochondria and helps in the generation of one-carbon units from serine to eventually yield glycine. It relies on pyridoxal 5'-phosphate (PLP), which is a type of coenzyme that assists the enzyme in performing its duties. SHMT2 enzyme is known to catalyze the reaction of tetrahydrofolate and serine to glycine and 5,10-methylene tetrahydrofolate by the transfer of a one-carbon unit from serine to tetrahydrofolate. New research and evidence suggests that SHMT2 plays a key role in the initiation of cancer, which is the main reason we are studying this enzyme. The enzyme has been identified to distort important metabolic pathways that lead to the formation of aggressive cancer cells. More specifically glycine, one of the products of reaction involving Serine and SHMT2, is the product that has been identified to cause the proliferation of cancer cells. Therefore, we believe that the inhibition of the enzyme SHMT2 will stop or significantly slow down the growth of tumors. If we are able to inhibit the SHMT2 enzyme, it will stop or significantly slow down the proliferation of cancer cells. Glycine, one of the products in the reaction of Serine and tetrahydrofolate to glycine and 5,10 methylene tetrahydrofolate, is believed to be the trigger of cancer cell proliferation. If SHMT2 is inhibited, then the reaction described above will not occur and there will be no products from the reaction. If there are no products, then there will be no glycine production; thus, there will be no cell proliferation. The enzyme SHMT2 acts as a catalyst to the reaction described above, therefore its inhibition should stop the proliferation of cancer cells and slow down tumor growth.