# East Indian Sandalwood Oil (EISO) as a Therapeutic Target for Disease: A Study of TRPM7 Ion Channels (Year IV)

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The student researcher previously concluded that East Indian Sandalwood Oil (EISO) inhibits AGS gastric cancer cells by inhibiting a TRPM7-like ion channel recorded via automated patch clamping, which allows single cells to be isolated and their membrane potentials recorded. These results suggest that EISO could be a therapeutic target for TRPM7 ion channels. Ion channels are new important therapeutic targets and are highly modified in cancer development. This year, a StepIV pulse protocol was implemented to ensure accuracy of data. Surprisingly,a new ionic current was recorded. This is postulated to be the Kv1.3 ion channel.4.125uM EISO inhibited the outward-current by 74% and the inward-current by 49%. This suggests that EISO could be a therapeutic target for Kv1.3 ion channels, in addition to TRPM7 ion channels. Additionally, it was determined that EISO could be a therapeutic target for other diseases where TRPM7 is known to be an important physiological factor. Through ATPlite,Calcein AM,Hoechst33342,and Propidium Iodide staining,FaDu oral cancer cells,MCF7 breast cancer cells, and HT29 colon cancer cells were evaluated for cell proliferation and cytotoxicity through high content imaging. It was concluded that EISO is cytotoxic at small concentrations (IC50: FaDu cells27.3uM,MCF7 cells24.5uM,HT29 cells29.6uM). Preliminary data suggests EISO doesn’t kill normal colon cells. These findings have broad applicability since TRPM7 is commonly up-regulated cancers and autoimmune diseases. Additionally, because EISO is Generally Regarded as Safe by the FDA, it has the potential to be a safe oral drug. Furthermore, the automated patch-clamp can be used further in the screening of new cancer drugs.

**Awards Won:**
First Award of $5,000