A Patch Clamp Study of TRPM7 Ion Channels: East Indian Sandalwood Oil (EISO) as a Possible Therapeutic Target for Cancer, Year II

Clements, Nia

Previously, it was concluded that East Indian Sandalwood Oil (EISO) inhibits AGS Gastric Cancer cells at low concentrations. This led to the question: how? To study EISO's mechanism of inhibition, the ion channels of AGS cells were investigated. Ion channels are new important therapeutic targets and are highly modified in cancer cell development. The gold standard method for studying ion channels is patch clamping, which allows single cells to be isolated and their ionic currents recorded. Last year, it was determined that AGS cells can be patch clamped on an automated system and a TRPM7-like ionic current was recorded. The purpose of this year's research was to determine if EISO affects the TRPM7-like ion channel. It was concluded that EISO inhibits the TRPM7-like ion channel. 4.125uM EISO inhibited the TRPM7-like outward current by 65% and the inward current by 23%. This suggests that EISO could be a therapeutic target for TRPM7 ion channels. Additionally, a Step IV pulse protocol was implemented to ensure accuracy of data. Surprisingly, with the addition of this protocol, a new ionic current was recorded. This is postulated to be the Kv1.3 ion channel, a voltage gated ion channel. 4.125uM EISO inhibited the Kv1.3-like outward current by 74% and the inward current by 49%. This suggests that EISO could be a therapeutic target for Kv1.3 ion channels. These findings have broad applicability since TRPM7 and Kv1.3 are important physiological factors in many cancers and autoimmune diseases. Additionally, because EISO is Generally Regarded as Safe by the FDA, it has the potential to be an oral drug for gastric cancer. Furthermore, the automated Patch Clamp can be used in other cancer cells lines in the screening of new cancer drugs.

Awards Won:
Third Award of $1,000