An Investigation of East Indian Sandalwood Oil (EISO)'s Mechanism of Inhibition in AGS Gastric Cancer Cells: A Patch Clamp Study of TRPM7 Ion Channels

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There is a need to develop and improve high throughput automated methods to screen potential cancer drugs. This study used innovative patch clamp technology and the AGS gastric cancer cell line as a test model. The previous study demonstrated that East-Indian-Sandalwood-Oil(EISO) is able to withstand stomach like conditions for prolonged periods and not only inhibits, but kills AGS cells at therapeutic concentrations. The purpose of this year’s research was to investigate the role of ion channels in the mechanism of action of EISO in killing AGS cells. Ion channels are new important therapeutic targets because they regulate transmembrane potential in all cells and are highly modified in cancer cell development. Using the AGS cell line, a whole-cell patch clamping method was used. The CytoPatch® protocol delivered a voltage ramp from -100mVto+100mV. EISO at 7.5uM&0.75uM was applied to the cell. In conclusion, results consistently showed cell catch,seal, and whole-cell breakthrough. Based on the resulting electrophysiological profile and ion channel recordings, a TRPM7-like channel was identified. Results indicated that with the addition of EISO, there was a large increase of electrical current. It is postulated that this effect could be a result of EISO opening the TRPM7-like channel, which could ultimately lead to cell death. The practical application of this research is the potential of the Cytopatch® technology to be used in other cancer cells and the rapid screening of new cancer drugs. Additionally, EISO’s profile could be an effective treatment for Gastric Cancer, plus diseases where TRPM7 is prevalent.

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