Intracellular Calcium Oscillation Promotes Migration and Invasion of Liposarcoma Cells

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Liposarcoma (LPS) is a form of cancer derived from fat tissue. Despite the fact that the 5 year survival rate for LPS patients with metastasis is only 15%, treatment for LPS hasn't been advanced for more than 30 years. Previous studies identified a factor called IWS1 that is upregulated in LPS tumors, and its level is negatively correlated with patient survival. However, the functions of IWS1 in LPS are still largely unknown. An Artificial Intelligence (AI) powered software was used to determine cell migration by comparing parental LPS cells to IWS1 knockout (IWS1-/-) cells. IWS1-/- cells migrate with lower speed (IWS1-/-: ~0.45μm/hour vs parental: ~0.55μm/hour, $P<0.0001$) and accelerate slower (IWS1-/-: 0.000015 μm/sec² vs parental: 0.000017 μm/sec², $P<0.0001$) than parental cells. Software was developed in Java & Python to analyze live cell videos that indicated intracellular calcium oscillation. The software quantified the number of cells that oscillated, total cell number, and outputted graphs for the oscillations of each cell. The peak-to-peak intervals of LPS parental and IWS1-/- were 120 seconds and 190 seconds between oscillations respectively, with around 60% of total Parentals oscillating and around 20-30% of total IWS1-/- oscillating. In summary, this study suggests that IWS1 promotes the migration of LPS cells through the regulation of intracellular calcium oscillation. Thus, understanding the molecular actions of IWS1 in regulating LPS metastasis allows for the discovery of drugs that can target IWS1 signaling to treat LPS patients.

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