

BioISI - Biosystems & Integrative Sciences Institute

VERÃO COM CIÊNCIA 2022 | BioISI Internship Projects

Project ID | VC22_1

Project Title | A natural polyphenol as a promising compound for cancer treatment

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Number of Fellowships available | 1 (one)

Abstract | Aquaporins (AQPs) are transmembrane protein channels essential in fluid homeostasis and the body's energy metabolism that facilitate the transport of water, glycerol, and small solutes. However, AQP1 and AQP3 appear aberrantly expressed in a wide range of clinical disorders including cancer and therefore their inhibition in tumor cells has been suggested as a novel therapeutic strategy. Most AQPs modulators reported so far are non-selective and toxic, which makes them difficult to be used in in vivo experiments. Using an innovative computational approach, we were able to identify a polyphenol compound with proven drug-like properties, which strongly inhibits AQP3 glycerol permeability ($IC_{50} = 6.02 \pm 0.13 \mu M$) and significantly reduces AQP1 water permeability ($IC_{50} = 22.83 \pm 0.01 \mu M$). Considering the role of these proteins in tumorigenesis, our goal is to use molecular docking and molecular dynamics simulations to understand the structural details regulating the observed inhibition, and further boost the development of other derivatives with improved selective inhibition of AQP1 and AQP3.