45th Euro-Global Summit on
Cancer Therapy & Radiation Oncology
November 27-28, 2023
Paris, France

Valeric acid suppresses liver cancer development by acting as a novel HDAC inhibitor

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Liver cancer is the fastest growing cause of cancer deaths in the United States due to its aggressiveness and lack of effective therapies. The current preclinical study examines valeric acid (pentanoic acid [C5H10O2]), one of the main compounds of valerian root extract, for its therapeutic use in liver cancer treatment. Anticancer efficacy of valeric acid was tested in a series of in vitro assays and orthotopic xenograft mouse models. The molecular is target of valeric acid was also predicted, followed by functional confirmation. Valeric acid has a broad spectrum of anticancer activity with specifically high cytotoxicity for liver cancer in cell proliferation, colony formation, wound healing cell invasion, and 3D spheroid formation assays. Mouse models further demonstrate that systematic administration of lipid based nanoparticle-encapsulated valeric acid significantly reduces the tumor burden and improves survival rate. Histone deacetylase (HDAC)-inhibiting functions of valeric acid are also revealed by a structural target prediction tool and HDAC activity assay. Further transcriptional profiling and network analyses illustrate that valeric acid affects several cancer-related pathways that may induce apoptosis. In summary, we demonstrate for the first time that valeric acid suppresses liver cancer development by acting as a potential novel HDAC inhibitor, which warrants further investigation on its therapeutic implications.

Biography

Rui Han is a physician of oncology department. He earned his Ph.D. in Yale University in 2019(USA), and earned his M.D. in Beijing Univerisity of Chinese Medicine(2015). He has published 9 original research SCI paper (total IF: 23.14) in recent 4 years. He is also in charge of two provincial research projects and participated in 3 NIH research projects of US. A peer reviewer of World Journal of Microbiology & Biotechnology (IF:2.477); editorial member of International Journal of Chinese Medicine and American Journal of Internal Medicine, etc. His research is focus on the cancer prevention and treatment by Integrated Chinese and Western Medicine.