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ORAL

Anti-caner effect of Xao tam phan (*Paramignya trimera*) methanol root extract on 3D cell culture model of human breast cancer cell line MCF-7

Lam-Huyen Nguyen-Thi[1,2], Sinh Truong Nguyen[1,2], Thao Phuong Tran[1], Chinh-Nhan Phan-Lu[1,2], Phuc Van Pham[1,2*]

[1]Key Laboratoy of Stem Cell Research and Application, University of Science, Vietnam National University, Ho Chi Minh City, VN

[2]Key Laboratory of Cancer Research, University of Science, Vietnam National University, Ho Chi Minh City, VN

Abstract

Cancer is one of the most leading causes of death all over the world. Great deal of effort has been made to find out new agents for cancer treatment. Cancer cell models for drug testing play a critical role in this process. In recent years, 3D cell models were proved to be more effective mimic structure and character of cancer cells in tumors than 2D cell culture, hence they present the effect of drug more accurate to in vivo result. Vietnam which is a tropical country has tremendous potential in cancer drug screening due to its diversity of herbals. Xao tam phan (Paramignya trimera) is a traditional medicine of Vietnam used in cancer treatment for a long time, however there was not enough science evidences proved its anticancer potency. The study aimed to generate multicellular tumor spheroid (MCTS) of MCF7 cells using hanging drop technique, followed by testing toxicity of Paramignya trimeraextract (PTE) on this model compared with monolayer cells cultured. Firstly, MCF7 cells were seeded on hanging drop plates with variety of concentrations. Spheroid size was tracked and growth curve was measured by Alamar Blue assay. Necrotic core of MCTS was evaluated by PI staining. The results showed that the number of 2500 cells/well generated the most suitable spheroids for anticancer drug screening with the diameter about 500µm and exhibit necrotic core at day 3 after seeding cells. Toxicity of Doxorubicine and Tirapazamine were then tested on the 3D model of MCF-7 cell lines compared to monolayer culture condition. The results showed that IC50 of DOX on 3D MCF7 cells was nearly 50 times higher than on monolayer MCF7 cells. TPZ, the agent are specifically toxic in hypoxia condition, showed the stronger anticancer ability on 3D models than on 2D (IC50 of TPZ on 3D models showed significantly lower versus 2D). These results indicated that PTE strongly inhibited MCF7 cells in both 2D and 3D condition. Interestingly, IC50 of PTE on 3D model was remarkably lower than on 2D (IC50 value is 168.9 ± 11.65µg/ml compared to 260.8 ± 16.54 µg/ml). Flow cytometry result also showed that PTE effectively induced apoptosis on 3D model MCF-7 cells. Invasion assay showed that PTE totally inhibited the invasion of MCF-7 cells at concentration 500µg/ml. These results emphasized the promising of PTE in cancer treatment.

*For correspondence:

ntlhuyen@hcmus.edu.vn

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