

Anticancer Activity of Nerolidol Through Apoptosis on MCF-7 Human Breast Cells

Yaping FAN¹ #, Jinfang GAO² #, & Jian XIN³ *

¹ Zhejiang Chinese Medical University,
hejiang Hangzhou, 310053, China.

² Department of Laboratory, Xinhua Hospital Affiliated to
hanghai Jiao Tong University School of Medicine, Chongming Branch, Shanghai, 202150, China.

³ Department of General Surgery Huangyan Hospital of Wenzhou Medical University,
Taizhou First People's Hospital, Zhejiang Taizhou, 318020, China.

SUMMARY. One of the most prevalent cancers in women worldwide is breast cancer. Nerolidol is a sesquiterpene alcohol and has anti-inflammatory, and anticancer activities. In this study, we examined the apoptosis-inducing potential of nerolidol in MCF-7 human breast cancer cells. Cultured MCF-7 cells were separated into the following four groups: Group 1 served as the Control, while Groups 2, 3, and 4 were treated with nerolidol at concentrations of 10 μ M/mL, 20 μ M/mL, and 40 μ M/mL, respectively. After 24 h of incubation, the cells were observed for morphological changes following nerolidol treatment. These cells were then utilized in numerous experiments. Nerolidol was administered to MCF-7 cells at various concentrations (1-400 M), which inhibited cell proliferation, increased ROS formation, and induced apoptosis. In addition, real-time PCR analysis revealed that nerolidol-treated cells had decreased expression of the anti-apoptotic gene Bcl-2 and increased expression of the pro-apoptotic genes Bax, Caspase-3, -9, and cytochrome c. These findings indicate that nerolidol causes apoptosis in MCF-7 cells by activating Bax in caspase-9 dependent manner-

RESUMEN. Uno de los cánceres más prevalentes en las mujeres a nivel mundial es el cáncer de mama. El nerolidol es un alcohol sesquiterpénico y tiene actividades antiinflamatorias y anticancerígenas. En este estudio examinamos el potencial inductor de apoptosis del nerolidol en células de cáncer de mama humano MCF-7. Las células MCF-7 cultivadas se separaron en los siguientes cuatro grupos: el grupo 1 sirvió como control, mientras que los grupos 2, 3 y 4 se trataron con nerolidol en concentraciones de 10 μ M/mL, 20 μ M/mL y 40 μ M/mL, respectivamente. Después de 24 h de incubación, se observaron los cambios morfológicos de las células después del tratamiento con nerolidol. Estas células se utilizaron luego en numerosos experimentos. Se administró nerolidol a células MCF-7 en varias concentraciones (1-400 M), lo que inhibió la proliferación celular, aumentó la formación de ROS e indujo la apoptosis. Además, el análisis de PCR en tiempo real reveló que las células tratadas con nerolidol habían disminuido la expresión del gen antiapoptótico Bcl-2 y aumentado la expresión de los genes proapoptóticos Bax, Caspasa-3, -9 y citocromo c. Estos hallazgos indican que el nerolidol provoca la apoptosis en las células MCF-7 mediante la activación de Bax de manera dependiente de la caspasa-9.

KEY WORDS: apoptosis, breast cancer, cytotoxicity, nerolidol, MCF-7 cells.

Yaping Fan and Jinfang Gao are co-first authors, they contributed equally to this work.

* Author to whom correspondence should be addressed. E-mail: xinjian753@sina.cn