Anti-cervical cancer activities of 3-(2-hydroxyphenyl) propionic acid and 2-hydroxycinnamic acid derivatives on cervical cancer cell lines

Kraikrit Utama¹, Puttinan Meepowpan², Thiti Janpirom², Paitoon Aoobchey³, Jiraporn Kantapan⁴, Padchanee Sangthong²*  
¹Interdisciplinary Program in Biotechnology, Graduate School, Chiang Mai University, Chiang Mai 50200, Thailand  
²Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand  
³Science and Technology Research Institute, Chiang Mai University, Chiang Mai 50200, Thailand  
⁴Department of Radiologic Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand  
*E-mail: padchanee.sangthong@cmu.ac.th

Abstract: Cervical cancer is the second most common cancer that causes death for Thai female population and Human papillomavirus (HPV) infection is a well-established cause of cervical cancer. This study aims to synthesize bioactive compounds from commercially available with 3-(2-hydroxyphenyl)propanoic acid (1a) and (E)-3-(2-hydroxyphenyl)acrylic acid (2a) by chemical reactions. The structures of the synthesized compounds were characterized using NMR spectroscopy, including ¹H, ¹³C, DEPT-90, DEPT-135 and HMQC experiments. Then, (E)-3-(2-hydroxyphenyl)acrylic acid derivatives were evaluated for cytotoxicity and were found to display inhibitory activity against normal mouse fibroblast L929 (CCL-1) with IC₅₀ value of 38.57 μM and cervical cancer cell lines (HeLa and SiHa) with IC₅₀ values of 17.83 and 29.94 μM, respectively. Finally, the active compound that had anti-cervical cancer activity was selected and was further investigated for anti-cervical cancer pathway using SDS-PAGE and 2-DE. The observed data will be beneficial for better understanding the anti-cancer pathway in the in vitro model.

Keywords: Human papillomavirus; Anti-cervical cancer; 3-(2-Hydroxyphenyl)propanoic acid; (E)-3-(2-Hydroxyphenyl)acrylic acid