Short communication

Synthesis and cytotoxic effects of (E)-3-(2,3-dimethoxyphenyl)-1-(5-methylfuran-2-yl) prop-2-en-1-one in MDA-MB231 and MCF-7 breast cancer cell lines

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\textbf{ARTICLE INFO}

Article history:
Received 30 September 2016
Received in revised form 5 December 2016
Accepted 16 December 2016
Available online 28 December 2016

Keywords:
Synthesis of DMMF
Cytotoxicity
MCF-7
Apoptosis
Single x-ray crystallography

\textbf{ABSTRACT}

A chalcone derivative, (E)-3-(2,3-dimethoxyphenyl)-1-(5-methylfuran-2-yl)-prop-2-en-1-one (DMMF) was synthesized and evaluated against various cancerous cell lines including colon adenocarcinoma (HT-29), myeloplastic leukemia (HL60), breast cancer (MCF-7 and MDA-MB231), normal hepatic cell (WRL-68) and normal breast cell (MCF-10A). The structure of DMMF was determined by EI-MS, \textsuperscript{1}H NMR and single X-ray crystallographic techniques. The DMMF possessed the highest cytotoxic effect against MCF-7 breast cancer cell (2.01 ± 1.53 µg/mL) and lowest against normal hepatic WRL-68 and breast cells after 24h of treatment. Induction of apoptosis and regulation of cell cycle progression results indicates the significant increase in early apoptosis and G2/M arrest after 48h of treatment in MCF-7 cells. Meanwhile, in MDA-MB231 cells, there was an increase in Sub G0/G1 cells population and early/late apoptotic cells upon treatment with DMMF. Additionally, DMMF effectively induced G2/M cell cycle arrest in MCF-7 cells and apoptosis in both MCF-7 and MDA-MB231 cells.

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1. Introduction

Chalcones are α, β unsaturated carbonyl compounds with 1,3-diaryl-2-propen-1-one architecture under the subclass of flavonoids. Chalcones are natural compounds occurring in various parts of medicinal plants especially in roots (Alpinia species, \textit{Piper meythysticum}), fruits (\textit{Ficus}, \textit{Dorstenia}, \textit{Morus}, \textit{Artocarpus}), seeds (\textit{Artocarpus communis}), as yellow pigments in flowers, and are also widely distributed in the species of genera \textit{Angelica}, \textit{Sophora}, \textit{Glycyrrhiza}, \textit{Humulus}, \textit{Scutellaria} and \textit{Parartocarpus} (Zhang et al., 2013; Vasconcelos et al., 2013). Additionally, chalcones possess a unique template that exhibited several biological activities including anti-inflammation, antimicrobial, antiparasitic, antioxidant, anti-angiogenic and anticancer properties (Reddy et al., 2012; Ye et al., 2005; Hsu et al., 2006; Pilatova et al., 2010; Sasayama et al., 2007; Lou et al., 2009; Mojzis et al., 2008). Chalcones such as flavokawian B and flavokawain A recently have received greater attention in anticancer drug discovery than naturally isolated compound due to its flexibility for modification and availability (Li and Vederas, 2009; Abu et al., 2013, 2014). There are several chalcones and poly-phenolic compounds that have important

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