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# Antitumor Activity of Atractylenolide II on Breast Cancer Cells through Regulation of Estrogen Receptor Protein Expression and NF-Kb Signaling Pathways

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Many women around the world suffer deeply from breast cancer. Although much effort is made to study the prevention and treatment of breast cancer, little attention is paid to the molecular mechanism of the disease. In the present study, considerable techniques such as Western blot, quantitative RT-PCR (qRT-PCR), luciferase immunohistochemistry and flow cytometry analysis were performed to analyze the effect of dependence. to atractylenolide II (ATR II) for breast cancer research. As indicated by our research results, ATR II could prohibit the proliferation of prostate cancer as well as breast cancer cells, in particular, ATR II induces apoptosis of the cells MDA-MB231 and MCF-7, by means of d cell arrest in the G2 / M phase. In addition, cellular apoptosis was induced by ATR II mainly associated with extrinsic mitochondrial pathways followed by activation of the death receptor (DR4) which regulated the Caspase-8 activation by cascade promotes the activation of Caspase-3 and, therefore, leads the breast cancer cell line to apoptosis. ATR II-induced apoptosis is also associated with its ability to regulate the activity of androgen receptors and the inhibition of NF-κB signaling pathways. Regarding this discovery, ATR II could be promising chemotherapeutic drugs for breast cancer cell lines. Breast cancer is naturally one of the most serious heterogeneous diseases for women around the world, causing millions of deaths each year [1]. Various efforts are devoted to overcoming this critical problem by paying particular attention to its prevention, diagnosis and treatment. More specifically, breast cancer can be treated by surgical methods, chemotherapy or radiotherapy, the action of which differs [2,3]. However, these approaches only have an impact at the early stage of tumor activity. These strategies have low and short-term efficacy due to their high toxicity, their non-targeting capacity and their ineffectiveness for long-term use [4]. Natural medicines have been used as an anti-tumor agent over the century because of their powerful anti-inflammatory and antioxidant activities and because of their ability to regulate the activity of molecular targets as well as their signaling pathways, which were linked to cell differentiation [5,6]. Among these sesquiterpene lactones, increased attention is paid to their ability to have fewer side effects [7]. Atractylenolide II is a sesquiterpene derivative of the plant Atractylodes Chinensis. ATR II is said to have promising antitumor activity, in particular on the gastric, colorectal and melanoma cell lines, through several signaling pathways [8-11]. Worldwide, more than 80% of breast cancers express the estrogen receptor α (ER-α). As a steroid hormone receptor, ER divided into ER alpha (ERα) and ER beta (ERβ). Previous studies have reported that the ERα-positive cell has a higher content than the ERα-negative cell line to regular breast cancer genes in an estrogen-dependent manner. Studies have also shown that overexpression of ER-β and inhibition of ERα could be an effective anti-tumor strategy against breast cancer [13]. The level of nuclear factor kappa-B (NF-κB) is high in human ER− breast cancers, compared to ER + cells. In addition, several studies have reported the high ration of nuclear factor kappa-B (NF-κB) in ER-human breast cancers, compared to ER + cells. The transcription factor NF-κB is the key point in regulating the immune system responses associated with diseases such as cancer. In its inactive form, NF-κB remains in the cytoplasm through its protein inhibitor (IκBs). In response to various stimuli, such as the binding of tumor necrosis factor (TNF) -α to its membrane receptor, IκBα is phosphorylated to Ser32 / Ser36 by I byB kinase (IKK). The IKK is a kinase complex with several subunits, generally composed of ER α and IKKβ and two molecules of essential modulator IKKγ / NF-κB (NEMO) [14]. The phosphorylated IκB is then degraded by the proteasome, which allows the NF-κB dimers to move towards the nucleus, where they stimulate the expression of target genes [15]. Despite its effective biological response against various cancer cells, ATR II has never been used before against breast cancer cells. The possible reason lies in the perplexity and unavailability of the molecular pathogenesis of breast cancer. This research aimed to use ATR II as an anticancer agent for ford

References

1. Zingue S, Michel T, Cisilotto J, Tueche AB, Ndinteh DT, et al. (2018) The hydroethanolic extract of Acacia seyal (Mimosaceae) stem barks induced death in an ER-negative breast cancer cell line by the intrinsic pathway of apoptosis and inhibited cell migration. J Ethnopharmacol 223: 41-50.

2. Currey A, Patten CR, Bergom C, Wilson JF, Kong AL. (2018) Management of the axilla after neo-adjuvant chemotherapy for breast cancer: Sentinel node biopsy and radiotherapy considerations. Breast J 24: 902-910.

3. Ponde NF, Zardavas D, Piccart M (2018) Progress in adjuvant systemic therapy for breast cancer. Nat Rev Clin Oncol, p: 1

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. 4. Quintela-Fandino M, Soberon N, Lluch A, Manso L, Calvo I, et al. (2017) Critically short telomeres and toxicity of chemotherapy in early breast cancer. Oncotarget 8: 21472-21482. 5. Losada-Echeberria M, Herranz-Lopez M, Micol V, Barrajon-Catalan E (2017) Polyphenols as Promising Drugs against Main Breast Cancer Signatures. Antioxidants (Basel)