

# Hubungan Kurkumin dengan Kadar Protein RASSF1A, Bax, dan Aktivitas Kaspase-3 dalam Menunjang Mekanisme Apoptosis pada Sel Kanker Payudara CSA03, MCF-7, dan MDA-MB-468 = The Relationship of Curcumin with Protein Level of RASSF1A, Bax, and Caspase-3 Activities in Conjunction with the Mechanism of Apoptosis in CSA03, MCF-7, and MDA-MB-468 breast cancer cells

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## Abstrak

Kurkumin merupakan pigmen kuning alami dari rimpang kunyit yang diduga memiliki aktivitas kemopreventif terhadap sel kanker melalui mekanisme jalur pensinyalan apoptosis. Penelitian ini bertujuan untuk menguji hubungan kurkumin terhadap kadar protein RASSF1A, Bax, dan aktivitas kaspase-3 dalam menunjang mekanisme apoptosis pada sel kanker payudara CSA03, MCF-7, dan MDA-MB-468. Penelitian eksperimen *in vitro* dilakukan di laboratorium terpadu Fakultas Kedokteran Universitas Indonesia Jakarta, laboratorium terpadu Fakultas Kedokteran Universitas YARSI Jakarta, RSUPN Dr. Cipto Mangunkusumo Jakarta, serta RS Islam Jakarta tahun 2016–2018. Pemberian kurkumin terhadap sel kanker didasarkan atas perbedaan dosis dan waktu pemberian. Uji sitotoksitas setelah pemberian kurkumin ditentukan secara MTS. Kadar protein RASSF1A dan Bax diuji secara ELISA. Aktivitas kaspase-3 digunakan untuk mengetahui apoptosis diuji secara flowsitometri. Selanjutnya perubahan morfologi sel diamati melalui pewarnaan acridine orange/ethidium bromide. Pemberian kurkumin terhadap sel-sel yang diuji menunjukkan konsentrasi IC<sub>50</sub> yaitu 40,85 µg/mL pada sel CSA03; 75,73 µg/mL pada sel MCF-7; dan 380,79 µg/mL pada sel MDA-MB-468. Pemberian kurkumin menunjang mekanisme apoptosis melalui jalur RASSF1A, Bax, dan aktivitas kaspase-3 pada sel kanker payudara.

**Kata Kunci:** Apoptosis, Bax, CSA03, kaspase-3, kurkumin, MCF-7, MDA-MB-468, pewarnaan ganda, RASSF1A

Curcumin is a natural yellow pigment from turmeric rhizome which is thought to have a chemopreventive effect on cancer through the mechanism of apoptotic signaling pathways. This study aims to examine the correlation of curcumin with protein level of RASSF1A, Bax, and caspase-3 activities in conjunction with the mechanism of apoptosis in CSA03, MCF-7, and MDA-MB-468 breast cancer cells. *In vitro* experimental research was carried out at the Integrated Laboratory of Faculty of Medicine, Universitas Indonesia Jakarta; RSUPN. Dr. Cipto Mangunkusumo Jakarta; and Jakarta Islamic Hospital during 2016–2018. Curcumin was administered to the cancer cells in different doses and time. Cytotoxicity test after administration of curcumin was determined by MTS. The protein level of RASSF1A and Bax were measured by ELISA. Caspase-3 activity was used to determine apoptosis by flow cytometry. Furthermore, changes in cell morphology were observed by acridine orange/ethidium bromide staining. The administration of curcumin to the cells showed IC<sub>50</sub> concentrations of 40.85 µg/mL in CSA03 cells; 75.73 µg/mL in MCF-7 cells; and 380.79 µg/mL in MDA-MB-468 cells. The administration of curcumin supports the mechanism of apoptosis through the RASSF1A, Bax, and caspase-3 activity in breast cancer cells.