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The coffee diterpene kahweol is an antitumoral compound for human estrogen receptor-negative breast cancer cells

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Although epidemiological studies indicate that coffee consumption is associated with a low incidence of several kinds of cancer, there are still few studies on the anti-tumoral effects of pure bioactive compounds isolated from coffee. The present study aims to identify the modulatory effects of kahweol, an antioxidant diterpene contained in unfiltered coffee, on a panel of human tumor cell lines. Kahweol inhibits tumor cell proliferation and clonogenicity and induces apoptosis in several kinds of human tumor cells, with a special incidence on the estrogen receptor-negative MDA-MB231 human breast cancer cells. In these breast cancer cells, the mentioned effects are accompanied by caspases 3/7 and 9 activation and cytochrome c release, both consistent with an activation of the intrinsic pathway of apoptosis. Kahweol also increases the phosphorylation levels of protein kinase B (AKT) and extracellular-signal-regulated kinase (ERK) observed in MDA-MB-231 cells. We also demonstrate the inhibitory effect of kahweol on the MDA-MB231 cell potential to migrate and to remodel extracellular matrix by targeting matrix metalloproteinase-9 and urokinase-type plasminogen activator, two key molecules involved in this process. Taken together, our data suggest that, indeed, kahweol behaves as an antitumor compound, especially against MDA-MB231 breast cancer cells.

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