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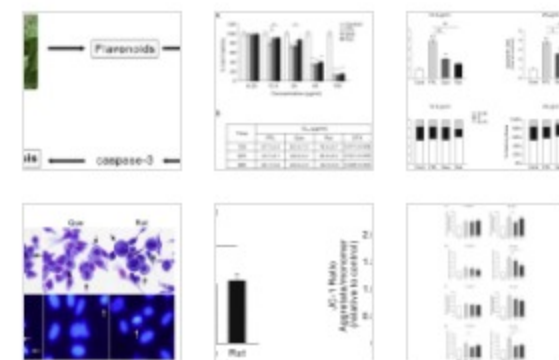
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## Chemico-Biological Interactions

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## Flavonoids from persimmon (*Diospyros kaki* L.) leaves inhibit proliferation and induce apoptosis in PC-3 cells by activation of oxidative stress and mitochondrial apoptosis

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## Highlights

- FPL induces apoptosis of prostate cancer cells *in vitro*.
- FPL stimulates oxidative stress and cytotoxicity.
- FPL activates mitochondrial apoptotic pathway.

## Abstract

Persimmon (*Diospyros kaki* L.) leaves are extensively used in Chinese medicine and are also excellent source of dietary polyphenols. Here we investigated the antiproliferative and pro-apoptotic activity of the total flavonoids extracted from persimmon leaves (FPL) in PC-3 cells. After treating cells with different concentration of FPL, Quercetin or Rutin for 24 h, MTT and flow cytometry were used to measure the cytotoxicity, apoptotic rate and cell cycle arrest. Compared with Quercetin and Rutin, FPL showed higher cytotoxicity at 12.5 and 25  $\mu\text{g/ml}$  concentrations and also presented lower  $\text{IC}_{50}$  in PC-3 cells. In addition, FPL induced PC-3 cells apoptosis by activation of oxidative stress, as detected by ROS, MDA, nitrite and iNOS activity, and increased mitochondrial membrane permeability. Morphological changes, inactivation of Bcl-2, upregulation of BAX, release of cytochrome *c* and activation of downstream apoptotic signaling in FPL-treated PC-3 cells also suggested apoptotic death. Meanwhile, FPL significantly inhibited migration of PC-3 cells. Therefore, FPL inhibited proliferation, migration and induced apoptosis of PC-3 cells by activation of oxidative stress and mitochondrial-related apoptosis.

## Graphical abstract



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