Biological and Medical Studies on Turkish Propolis

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First study: Inhibition of erythrocyte lipid peroxidation
Effects of various natural products on LDL oxidation

- Absorbance versus oxidation time (min)
- KONT: Control
- POL: Pollen
- PRO: Propolis
- SAR: Garlic
- IS: Nettle
Propolis induces caspase-3 activity in cancer cell lines (Tr J Biochem 29:87, 2004)

Propolis is a bee product which consist of resins and bee waxes. The major components of propolis responsible for biological activity are flavonoids, phenolic acids and esters present in resins. Propolis has antibacterial, antiviral, anti-inflammatory, antifungal, antimalarial, immunostimulatory, local anesthetic, antihistaminic, antioxidant and tumor cytotoxicity activities. Apoptosis occurs when the cell life cycle ends or various apoptosis triggers, such as radiation, hazardous chemicals, drugs, damage the cell. Caspase-3 activation has an effectors role in both the receptor and mitochondria mediated apoptosis. Caspase cascade and cell death can be initiated by caspase-3 activation. DMSO extracts of natural and commercial propolis different concentrations were used to investigate antitumoral and apoptosis-inducer activity in myeloid HL-60 cell line and lymphoid cell culture with propolis, cell cycle analyses by flow-vytometry and spectrophotometric caspase-3 activity were carried out to determine the apoptosis-induced activity. When compared caspase-3 activities for lymphoid and myeloid cell lines, apoptosis was induced by natural propolis extracts and caspase-3 activities were increased 5-12 times optimally at 12.5 and 6.25 mg/ml propolis concentrations. It was concluded that natural propolis may induce the apoptosis by increasing caspase-3 at these concentration and hence propolis has antitumoral activity.
Flow cytometric cell-cycle analysis of HL-60 cell line treated with propolis (6.25 mg/ml): Induction of apoptosis

- Concentration of propolis versus % of fluorescence positivity
- PMA: Phorbol myristate acetate (for induction of leukocytes)
Effects of Turkish pollen and propolis extracts on respiratory burst for K-562 cell lines

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Fig. 1. Effects of pollen and propolis extracts on PMA-induced respiratory burst in K-562 cells. (0 notation shows pollen and 2 shows propolis.)

Fig. 2. Effects of pollen and propolis extracts on PMA-induced respiratory burst in K-562 cells. (0 notation shows pollen and 2 shows propolis.)

Total polyphenolics

Total flavonoids

FRAP Assay

Total Antioxidant Status Assay

WEP

EEP (Ethanolic extract)
Effect of Turkish propolis extracts on proteome of prostate cancer cell line

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Barlak et al. 2011
Effects of bee pollen and propolis extracts on expression of voltage-gated sodium channels in metastatic human prostate cell lines (PhD thesis, Çolak M, 2010)

- RTPCR
- Melting curve analysis of VGSC Nav1.5 isoform in PC-3 cell lines treated with DEP
- Djamgoz et al. reported that VGSC proteins increased in human prostate cancer (Prostate 48:165-178, 2001; Molecular Cancer 6:1-12, 2007), and in turn metastatic potential increased.
Effects of bee pollen and propolis extracts on expression of voltage-gated sodium channels in metastatic human prostate cell lines (PhD thesis, Çolak M, 2010)

- Melting curve analysis of VGSC Nav1.5 isoform in PC-3 cells treated with WEP (=Water Extracts of Propolis)
Effects of bee pollen and propolis extracts on expression of voltage-gated sodium channels in metastatic human prostate cell lines (PhD thesis, Çolak M, 2010)

- Decrease (%) in expression levels of VGSC isoforms
- 1 & 6: 20 µg/ml WEP
- 2 & 7: 20 µg/ml DEP
- 5 & 10: Control
COMET Assay: Fluorescence microscopy
Effect of Turkish propolis extracts on genotoxicity of fibroblast cell lines by DNA repair enzymes. Turanlı, et al. Tr J Biochem 36(S), 2011

- Neil-1 and hOGG are DNA glycosylase enzymes. They repair DNA damage by oxidative stress.
Research team in K.T.U, Trabzon

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