APImondia 2009

Effect of chrysin detected in honey on melanoma cells

Elena Pichichero, Rosella Ciccone, Antonella Canini

Honey Research Center – Dept. of Biology, University of Rome "Tor Vergata"

Chemico-physical parameters

Water content	HMF	Diastase	pH	Fructose	Glucose	Sucrose
16 g/100g	5 mg/kg	10 S. Unit	4.13	44.5 g/100g	27.1 g/100g	0.02 g/100g

Flavonoid (mg QE/Kg)	Phenolic acid (mg GAE/Kg)	FRAP (mmol Fe^{2+}/Kg)	DPPH IC_{50} (mg/ml)
67.3 ± 3.4	113.5 ± 5.6	1.38 ± 0.7	21.6 ± 1.2

Research Article

Received: 9 July 2008 Revised: 10 November 2008 Accepted: 11 November 2008 Published online in Wiley Interscience: 6 January 2009

(www.interscience.wiley.com) DOI 10.1002/jsfa.3484

Characterisation of the phenolic and flavonoid fractions and antioxidant power of Italian honeys of different botanical origin

Elena Pichichero, Lorena Canuti and Antonella Canini*

Table 1. Phenolics and flavonoids identified by HPLC-UV in different honeys[a]

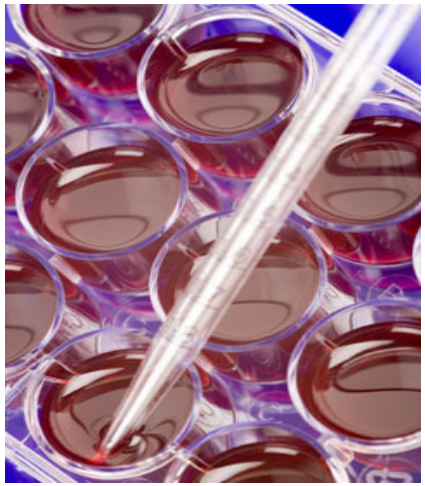
		Type of honey								
Peak	Phenolic/flavonoid component	Acacia	Ailanthus	Chestnut	Orange	Savory	Sulla	Thymus	Honeydew	Multifloral
1	Gallic acid	0.295 ± 0.015	ND	0.351 ± 0.018	0.195 ± 0.009	1.770 ± 0.095	ND	0.265 ± 0.013	1.043 ± 0.052	0.309 ± 0.015
2	Chlorogenic acid	0.229 ± 0.018	0.181 ± 0.011	0.552 ± 0.022	0.166 ± 0.007	1.172 ± 0.059	0.229 ± 0.011	0.967 ± 0.048	0.764 ± 0.022	0.295 ± 0.015
3	*p*-Coumaric acid	0.084 ± 0.012	0.298 ± 0.021	0.223 ± 0.011	ND	0.216 ± 0.013	0.084 ± 0.005	ND	0.253 ± 0.009	0.098 ± 0.004
4	Caffeic acid	0.098 ± 0.008	0.056 ± 0.002	0.106 ± 0.005	ND	ND	0.098 ± 0.004	0.106 ± 0.005	0.187 ± 0.007	0.108 ± 0.006
5	Myricetin	ND	0.072 ± 0.003	1.389 ± 0.072	0.101 ± 0.007	ND	0.065 ± 0.005	0.567 ± 0.028	0.097 ± 0.005	ND
6	Quercetin	0.044 ± 0.007	0.043 ± 0.006	0.046 ± 0.004	ND	0.057 ± 0.005	0.044 ± 0.002	0.067 ± 0.004	0.093 ± 0.004	0.087 ± 0.004
7	Genistein	0.183 ± 0.015	0.142 ± 0.016	0.101 ± 0.007	ND	0.175 ± 0.017	ND	0.101 ± 0.007	0.131 ± 0.006	ND
8	Kaempferol	0.094 ± 0.014	0.093 ± 0.007	0.095 ± 0.008	0.070 ± 0.006	0.114 ± 0.005	0.094 ± 0.005	ND	0.079 ± 0.005	0.143 ± 0.006
9	Apigenin	0.048 ± 0.004	0.042 ± 0.004	0.036 ± 0.002	0.023 ± 0.001	0.067 ± 0.006	0.048 ± 0.004	0.136 ± 0.002	0.076 ± 0.003	0.067 ± 0.003
10	Chrysin	0.467 ± 0.022	0.236 ± 0.024	0.081 ± 0.004	0.318 ± 0.016	0.360 ± 0.018	ND	0.081 ± 0.004	0.230 ± 0.018	0.383 ± 0.015
11	Galangin	0.506 ± 0.024	0.320 ± 0.013	0.149 ± 0.006	0.380 ± 0.015	0.609 ± 0.024	ND	0.185 ± 0.006	0.322 ± 0.016	0.426 ± 0.017
	Total identified phenolics	2.048 ± 0.095	1.480 ± 0.074	3.099 ± 0.15	1.253 ± 0.062	4.540 ± 0.227	0.662 ± 0.046	2.475 ± 0.120	3.275 ± 0.188	2.325 ± 0.007

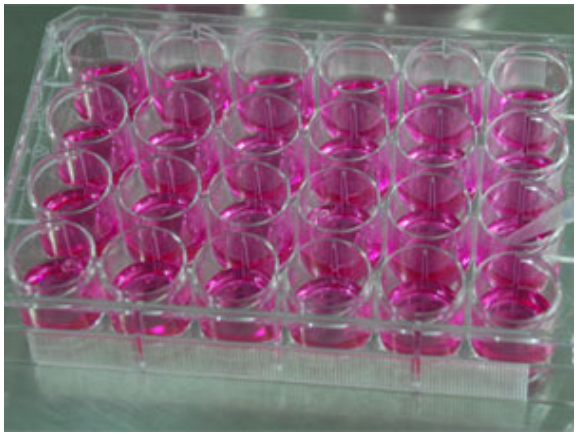
[a] Values are expressed as mean (mg kg^{-1} honey) ± standard deviation of three independent analyses. ND, compound not detected.

Experimental plain

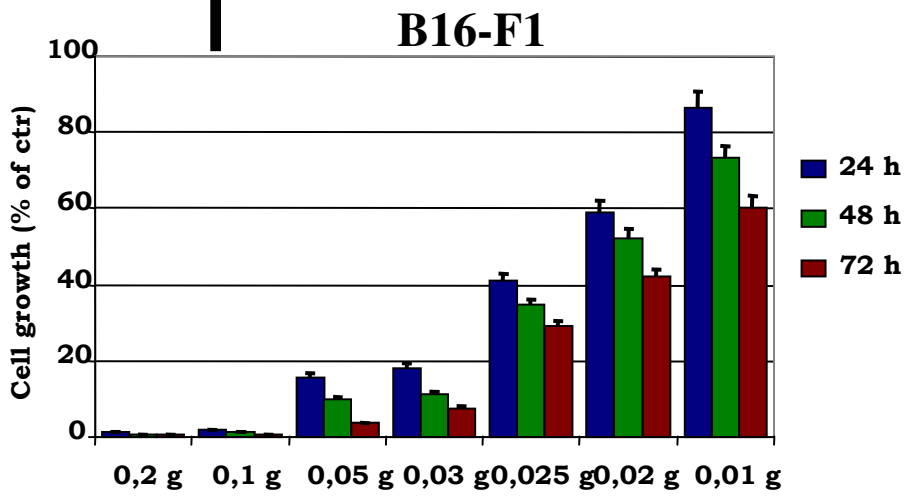
A375 human melanoma

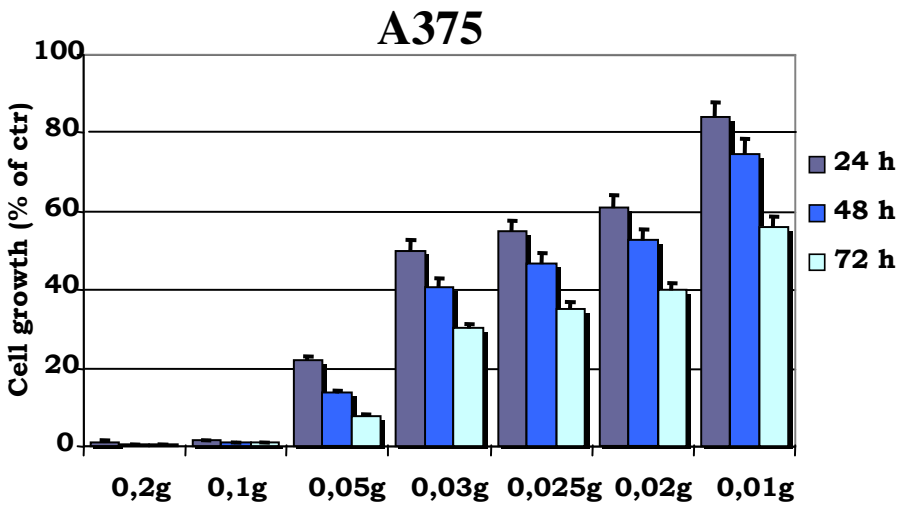
B16-F1 murine melanoma

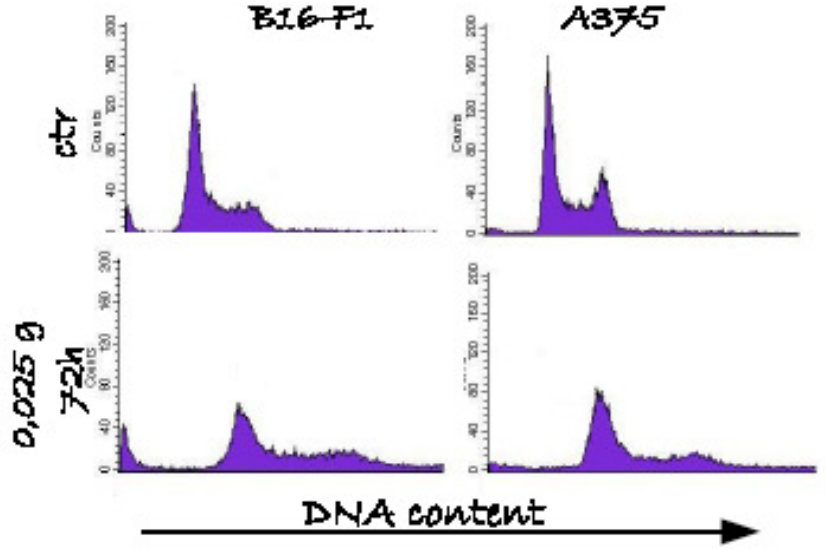




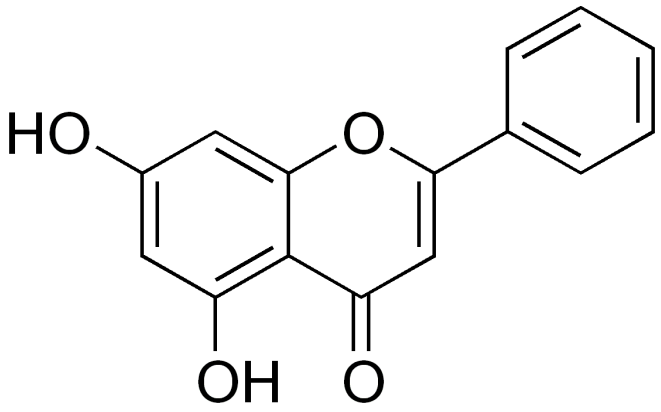
Biological effect of honey on melanoma cells





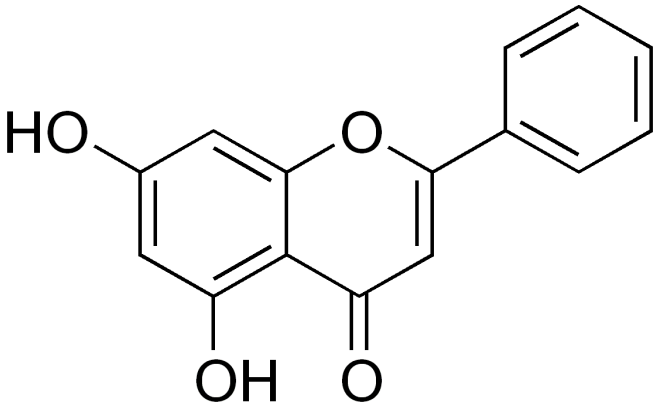


Chrysin



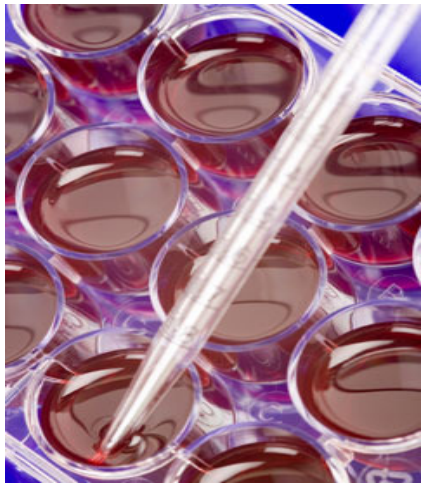
- Chrysin is a secondary metabolite of the class of flavones.
- Was extracted for the first time from the blue passion flower.
- Has multiple biological activity, such as anti-inflammation, anti-cancer and anti-oxidation

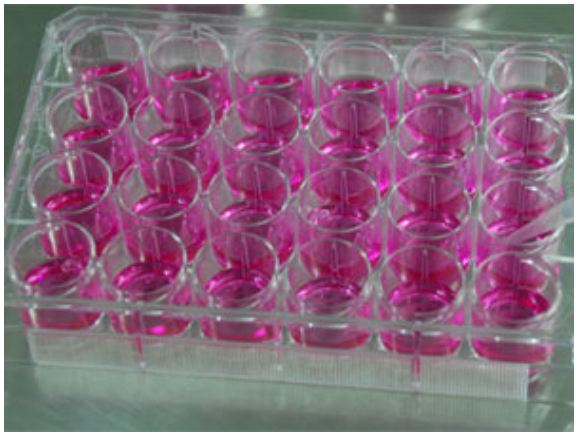
Experimental plain



A375 human melanoma

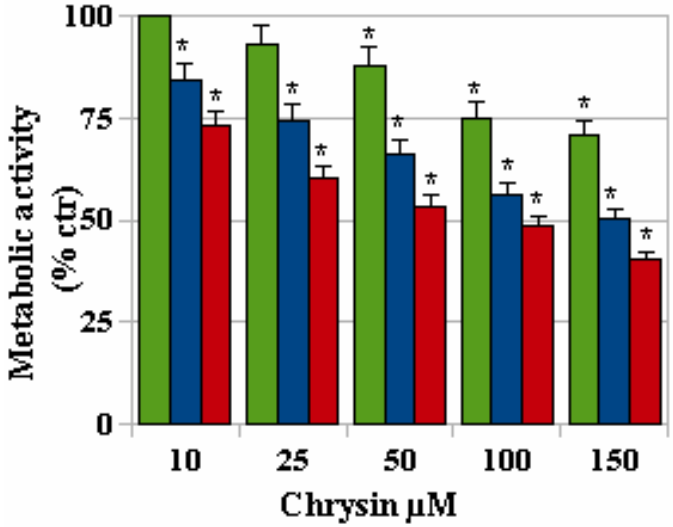
B16-F1 murine melanoma

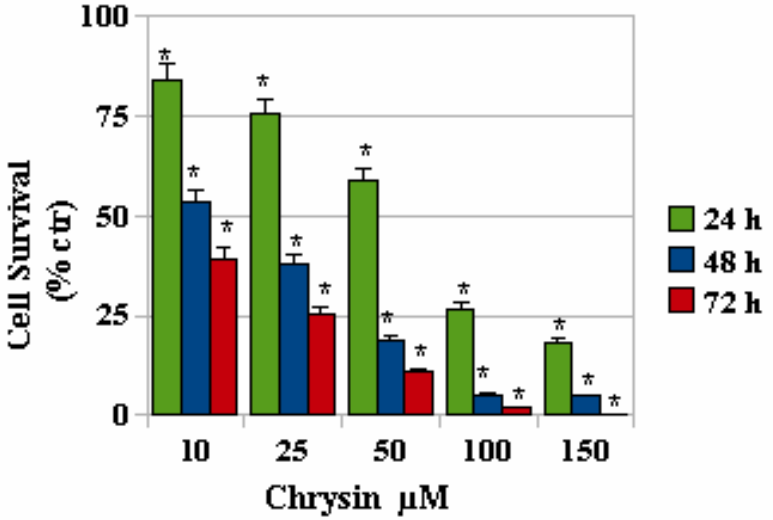




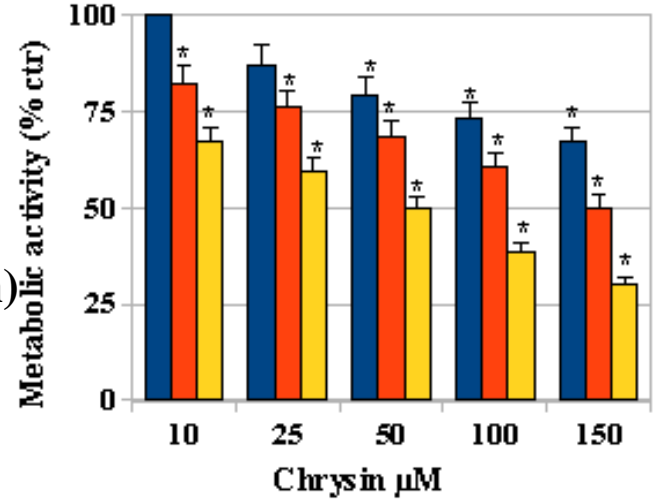
Chrysin inhibited cell proliferation

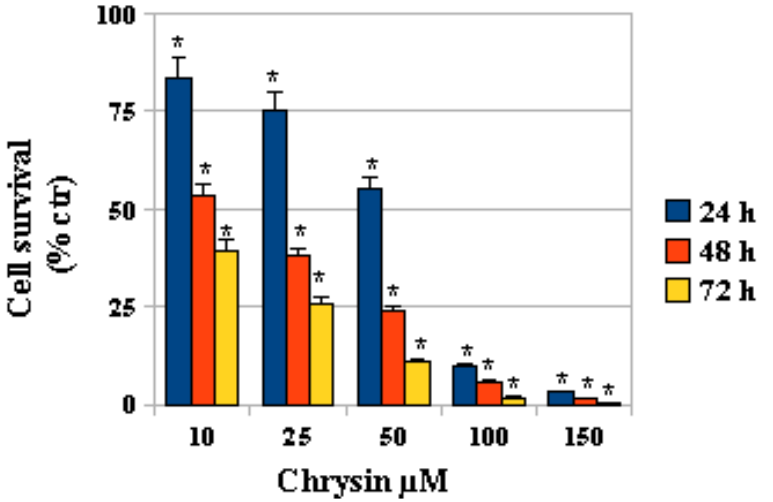
B16-F1 (murine)



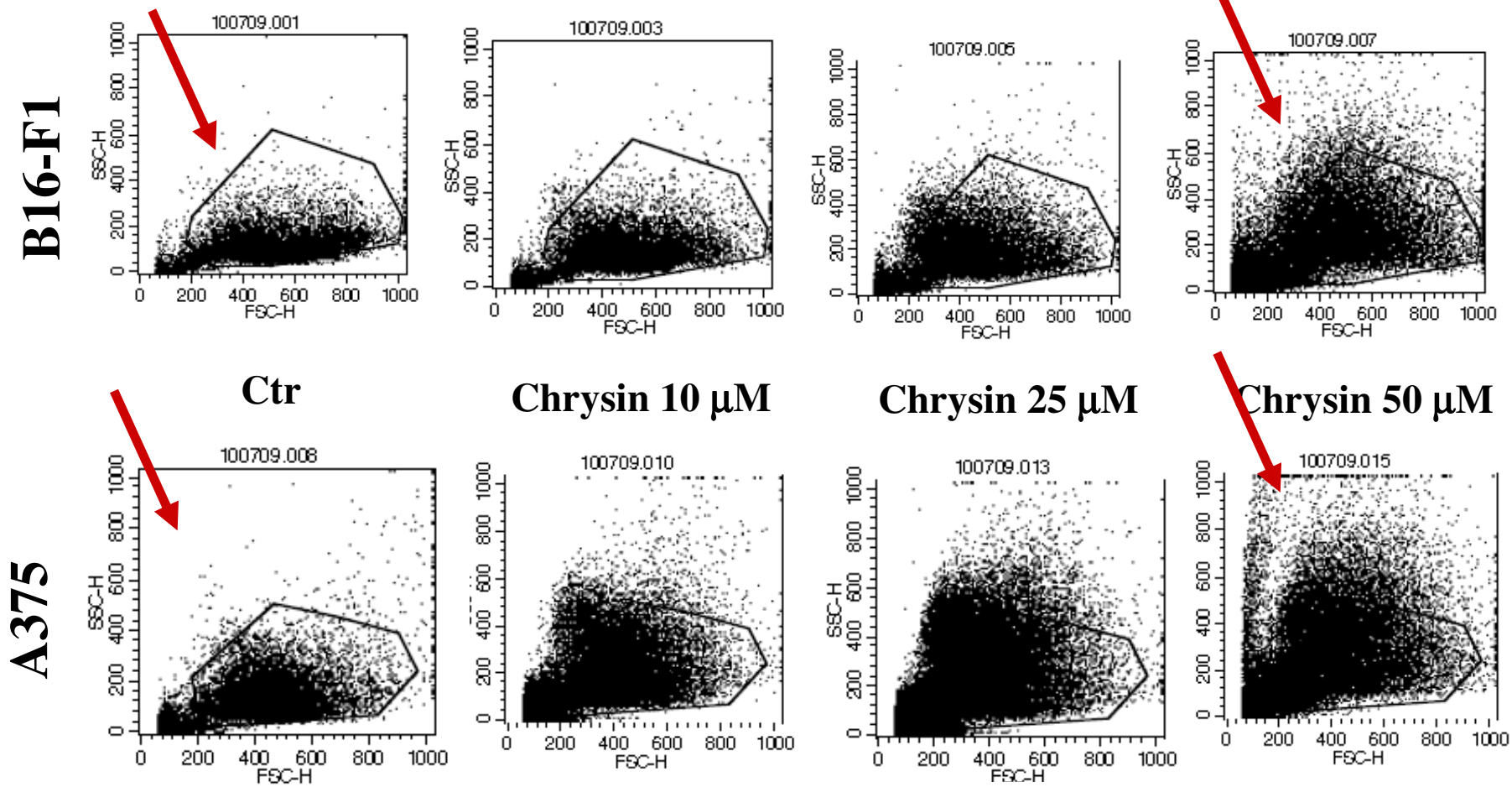


A375 (human)

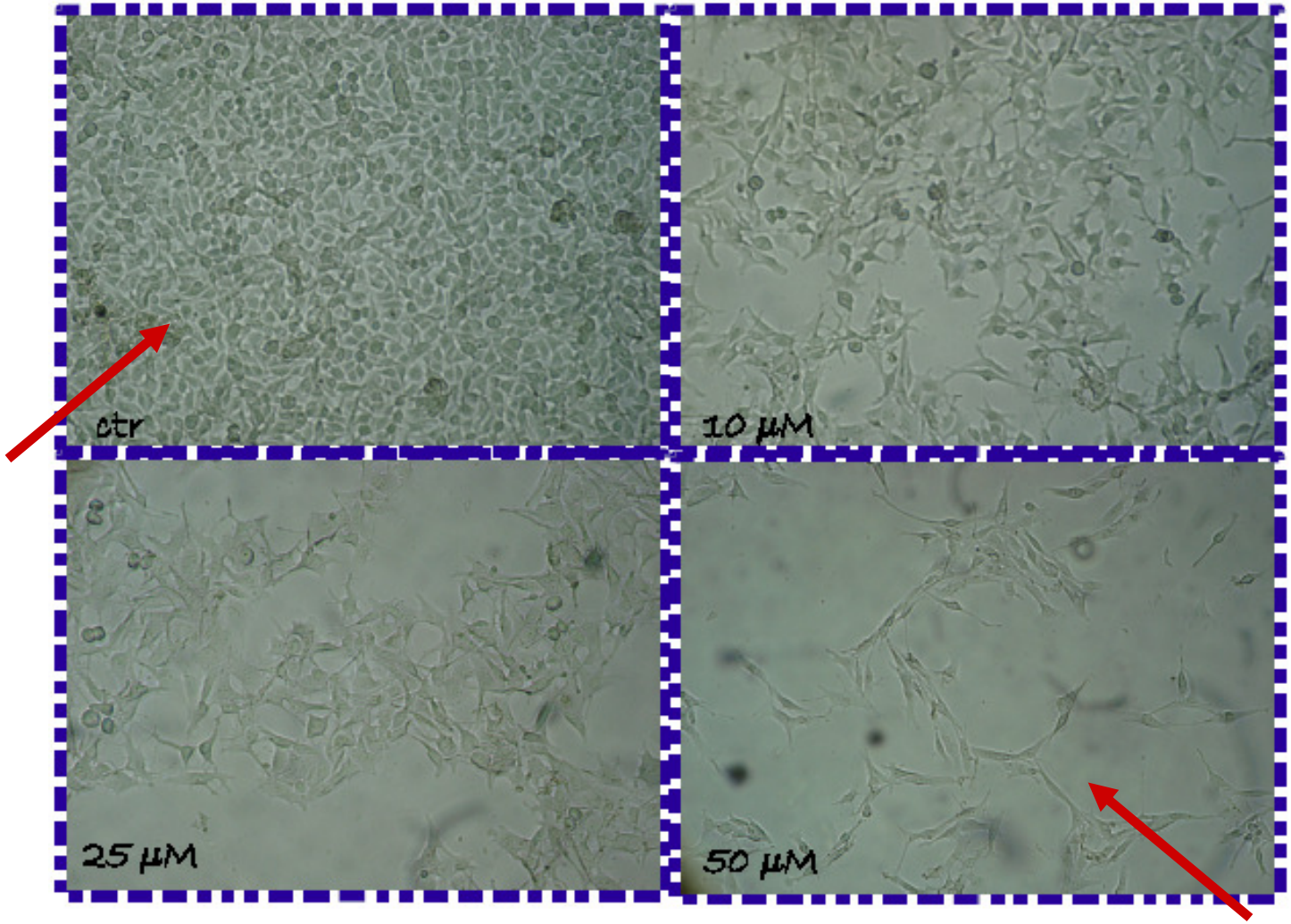




Chrysin induceded phenotipic alteration

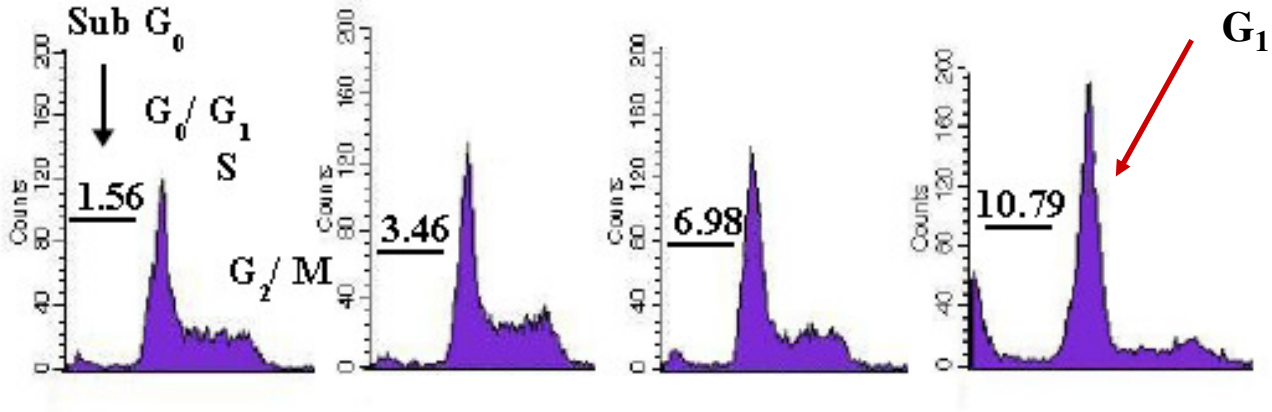


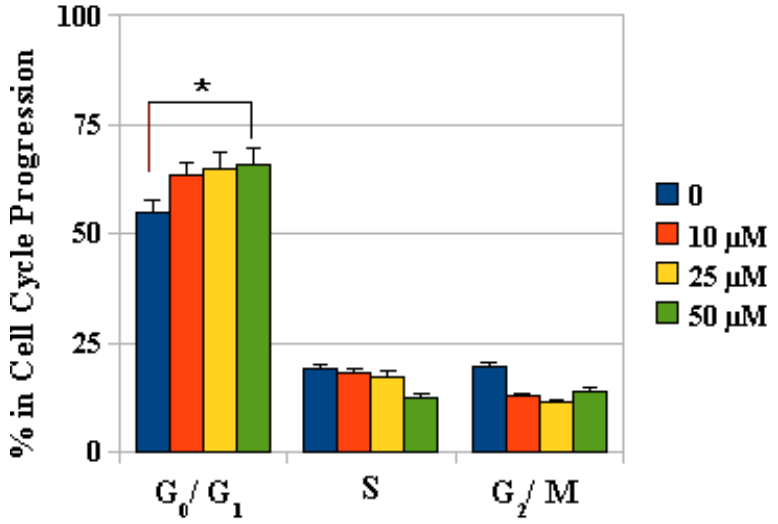
Morphological alteration after chrysin treatment

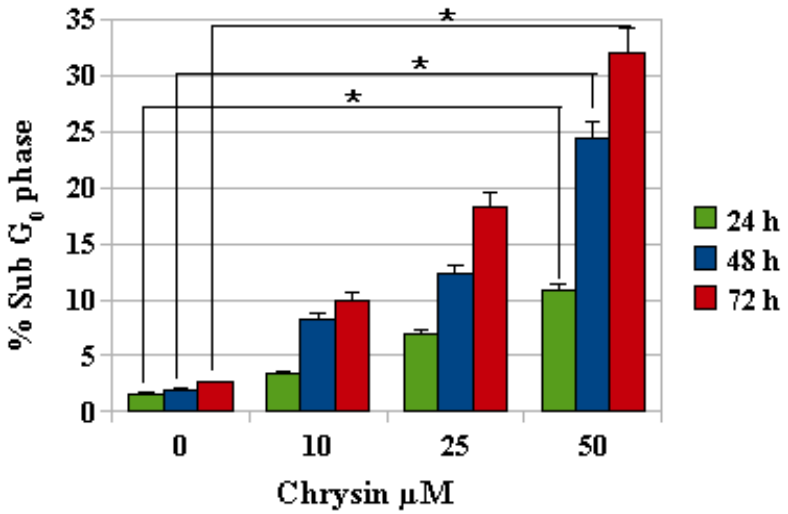


B16-F1 cells exposed for 72 h to chrysin change their morfology into the shape of neural type cells

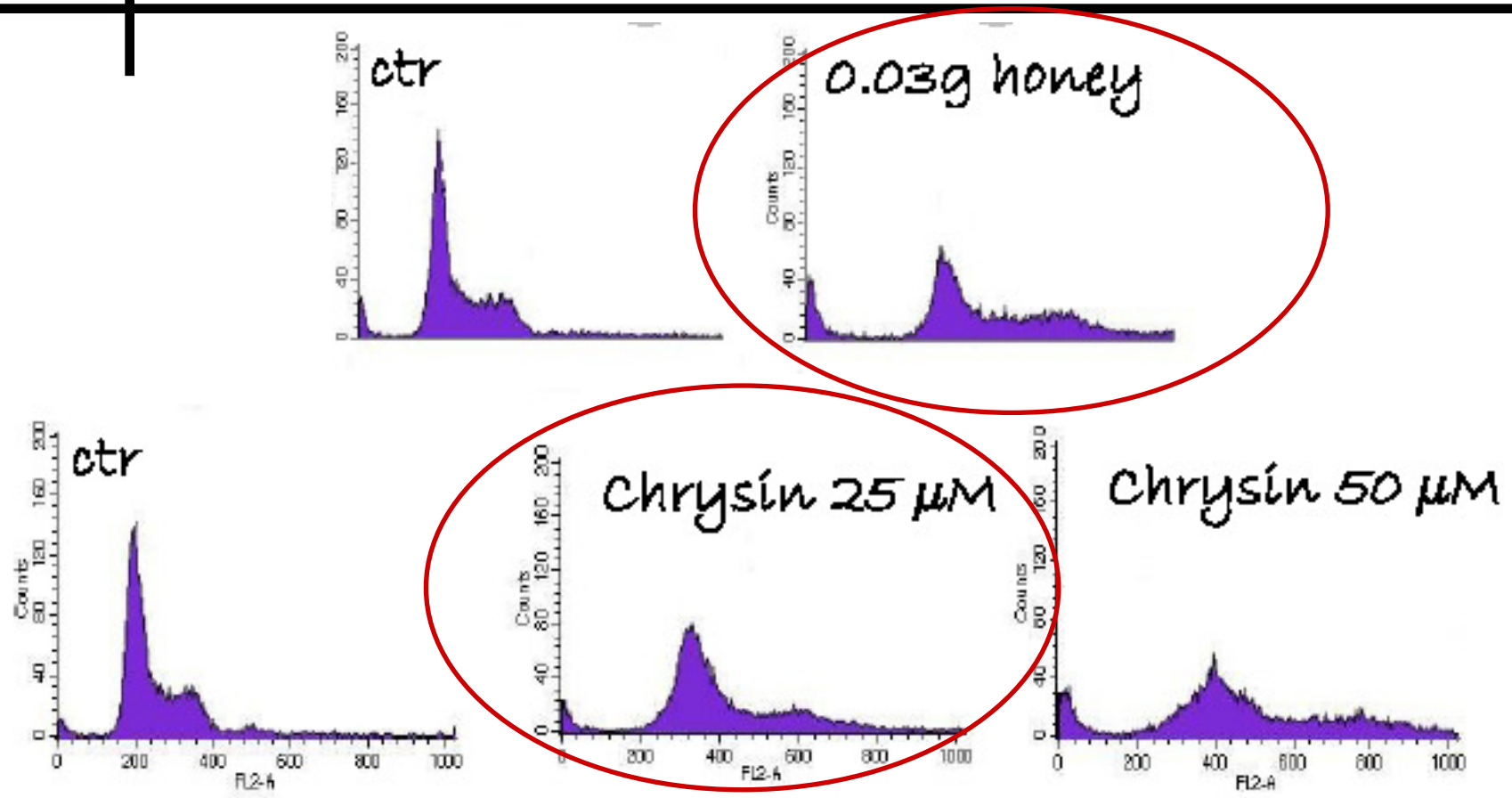
Chrysin change the cell cycle progression



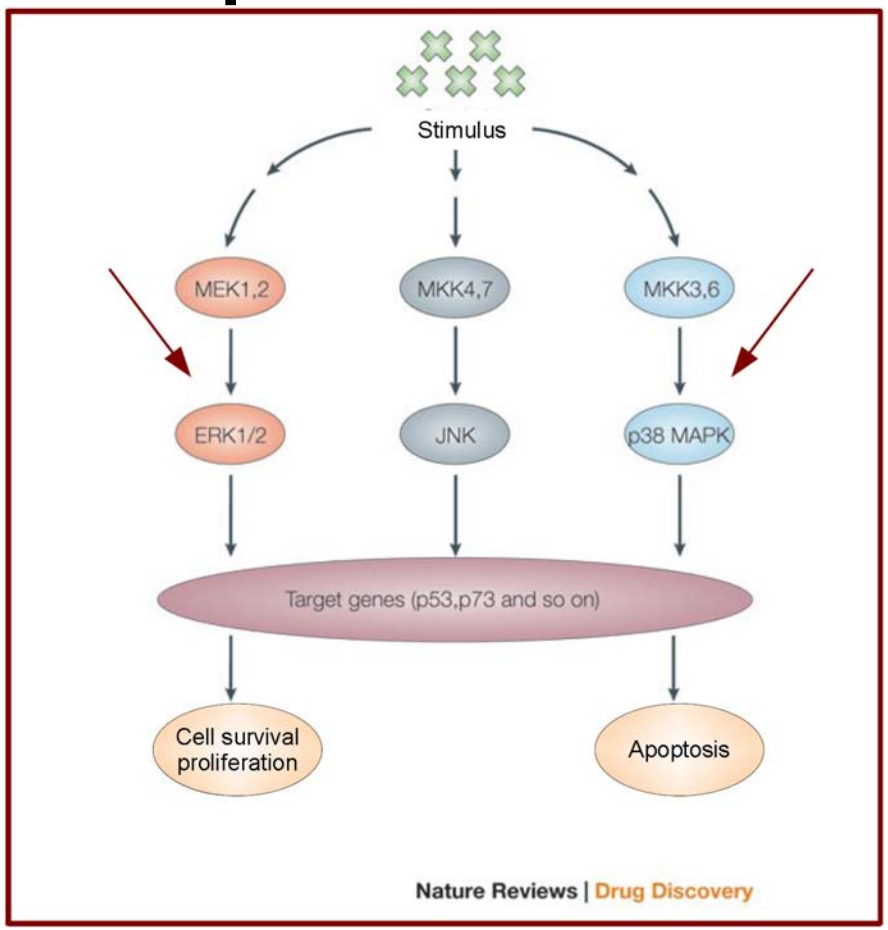


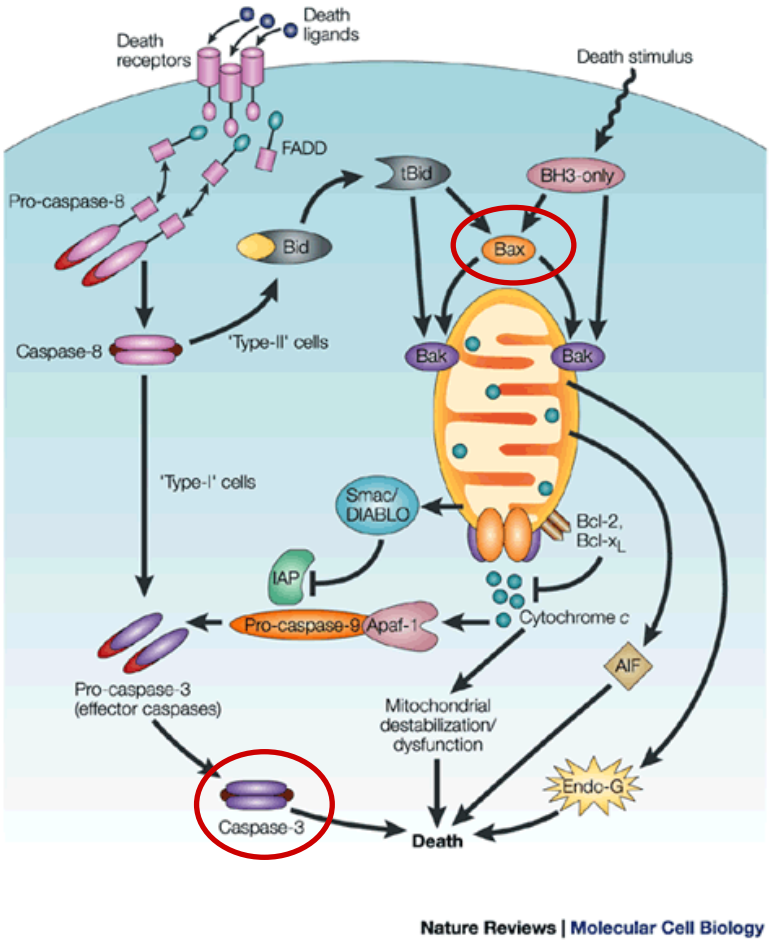


Chrysin induced polyploidy in melanoma cells

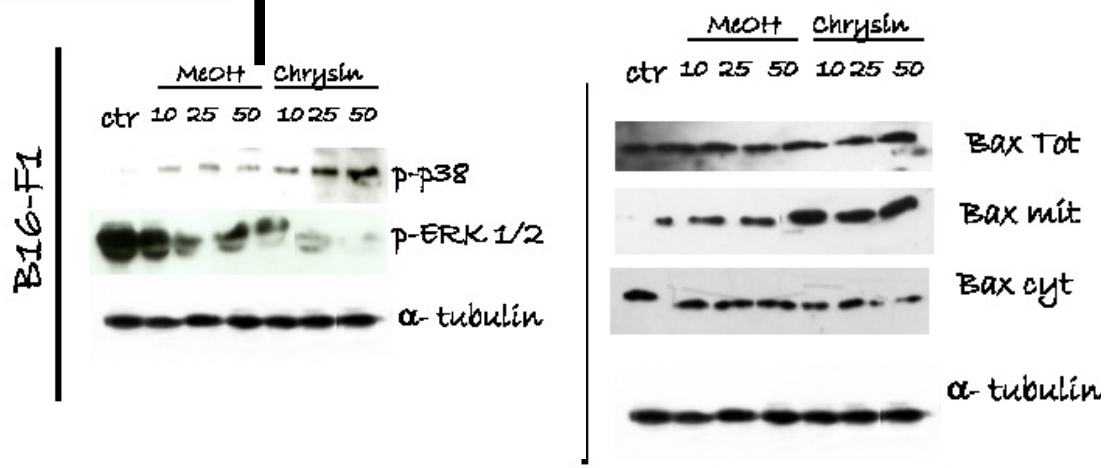


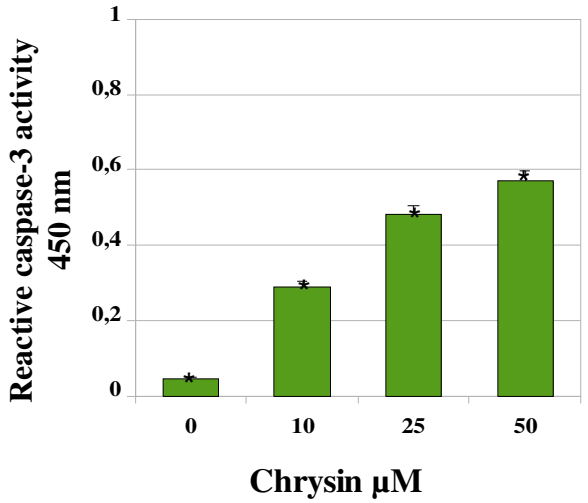
Cell molecular target

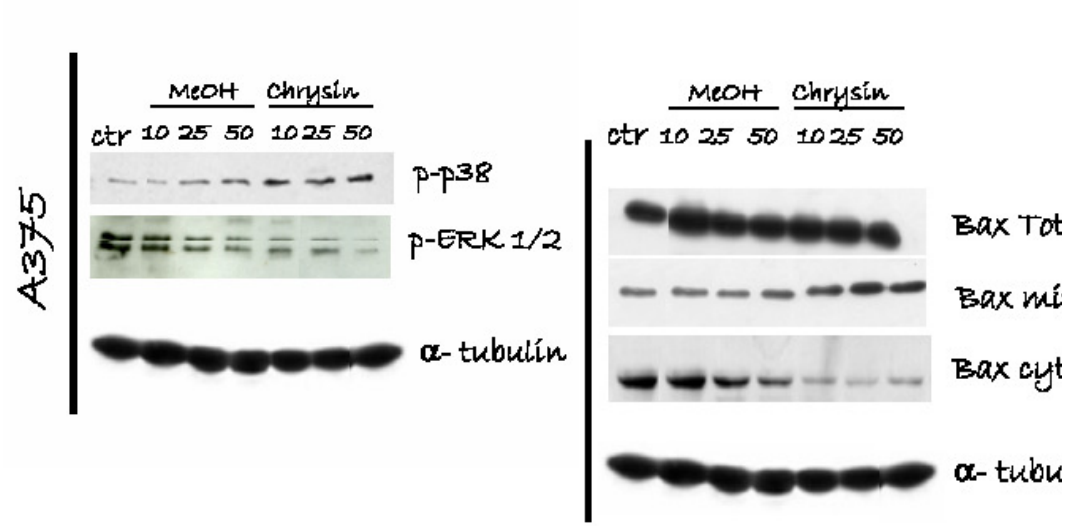


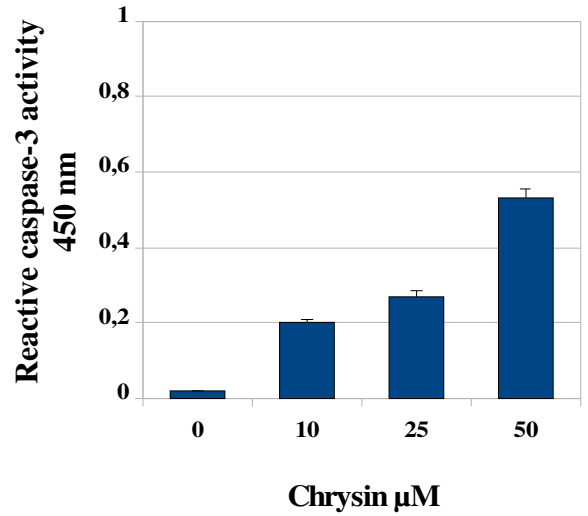


Molecular pattern activated in chrysin cells treated









Conclusion

- ✓ Robinia honey inhibited cell proliferation and altered the cell cycle of melanoma cells
- ✓ Chrysin is implicated in the effect observed in honey treatment
- ✓ Chrysin induced cell differentiation by the inhibition of ERK ½ and activation of p38 MAPKs
- ✓ Chrysin induced apoptosis by the activation of p38 MAP kinase that might mediate Bax translocation to mitochondria and subsequent activation of the apoptotic cascade
- ✓ These results are starting point for the apitherapy in Italy.