Abstract

Traditional Chinese Medicine (TCM) is becoming one of the most potential scientific fields and an exciting trend of research on TCM is obvious, due to its long history, good therapeutic effects and abundant botanical resources. However, TCM is based on an unique theory which is different from western scientific thinking. Thus, much work has been dedicated to translate or to modernize the TCM system to western medical system nowadays. Many botanical resources which are declared effective in TCM are directly tested through the western scientific methods to discover and to prove the functionality, the active compounds and to clarify the pharmacodynamic and pharmacokinetic mode of action.

Wounding healing is an important issue for life quality in the world. In this work skin active herbal drugs from TCM have to be identified from the botanical resources and further to be investigated concerning *in vitro* functionality on human skin cells and phytochemical aspects.

A broad screening for wound healing effective plants was performed according to Pharmacopoeia of People's Republic of China (2005 Version) and 160 herbal drugs have been described as effective species for this medical use. Further literature research was performed to identify plant species from this group which have not been investigated for wound healing or detailed phytochemistry until now in detail. *Angelicae sinensis* radix, *Archyranthis bidentatae* rhizoma, *Cimicifugae* rhizoma, *Corydalis* rhizoma, *Gardeniae* fructus, *Houttuyniae* herba, *Lonicerae japonicae* caulis, *Lonicerae japonicae* flos, *Moutan* cortex, *Notoginseng* radix et rhizoma, *Paeoniae rubrae* radix and *Rehmanniae* radix were finally selected for detailed investigations.

Standardized water and ethanol-water extracts were tested on primary normal human dermal fibroblasts (pNHDF) and HaCaT keratinocytes on influence on dehydrogenase activity (MTT, XTT tests), cell vitality (neutral red assay), cellular proliferation (BrdU incorporation ELISA) and necrosis-inducing activity (LDH test).

Extracts from *Notoginseng* radix et rhizoma, *Angelicae sinensis* radix and *Lonicerae japonicae* flos turned out to be moderate active; extracts from *Moutan* cortex (MC) had significant stimulating activities, while extracts from all other herbal drug materials turned out to be inactive.

Detailed investigations were performed on water extract and ethanol-water (6:4) extract from *Moutan* cortex (MC), enhancing the cell viability of keratinocytes and pNHDF in a dose-dependent manner with about 20 to 40 % increased cell viability at 100 μg/mL. Bioassay-guided fractionation led to a EtOAc soluble part (fraction 10) and a water soluble part (fraction 12). Both fractions stimulated the cell viability on both cell types about 10 to 30 % at 0.1 to 10 μg/mL. Also cell proliferation was increased for both cell types.

Bioassay-guided fractionation of fractions 10 and 12 by chromatography on Sephadex® LH-20 and MCI gel yielded the flavan-3-ols (+)-catechin, (-)-epicatechin-3-O-gallate and the oligomeric proanthocyanidins (-)-epicatechin-(4β→8)-catechin and epicatechin-3-O-gallate-(4→8)-catechin. Additionally trigalloyl-glucose and 1,2,3,4,6-penta-O-galloyl-β-D-glucose (PGG) were isolated. From a lipophilic fraction paeonol was isolated.

The proanthocyanidin-containing fractions as well as PGG were shown to contribute substantially to the stimulating influence on skin cell physiology. Especially PGG enhanced cell viability and cellular proliferation of HaCaT keratinocytes at concentration of 1.1×10^{-4} mol/L.

In this work, *Moutan* cortex has been proven to be a potential TCM herbal drug for wound healing. By the clearly structured biossay guided research, the *in vitro* cell investigations showed clearly the skin cell viability/proliferation stimulating effects of *Moutan* cortex which can be correlated to the tannin-like polyphenol compounds. These results strongly suggest that *Moutan* cortex is a potential TCM plant for wound healing by promoting the proliferation of pNHDF and HaCaT keratinocytes.