Alexandra Marina Deters, Summary

Oligo- and Polysaccharides: isolation, characterisation and influence on cell pyhsiology of human keratinocytes

doctoral thesis, submitted in 2003

The present study deals with the influence of exogeneous oligo- and polysaccharides on the cell physiology of human keratinocytes (normal human keratinocytes, NHK and HaCaT) *in vitro*.

Polysaccharides were isolated and characterized from different herbs and plants used in traditional medicine, upon their high amounts of mucilage or because of their indication for wound healing.

Gaschromatical analysis coupled with mass spectrometry revealed that mostly arabninogalactans, galactans, rhamnogalacturonans, neutral arabinoxylans, acidic xylans, fucoidans, □-glucans and glucomannans were the most abundant polysaccharides. Depending on their structures the polysaccharide influenced the cell physiology in different ways. Xylans and glucomannans predominantly induced the cell proliferation of NHK and HaCaT cells without a visible effect on the cell viability (MTT-test). □-glucans and polysacchairdes of *Fucus vesiculosus* stimulated the differentiation of NHK. Rhamnogalacturonans enhanced the cell viability and the proliferation of human keratinocytes. Cytotoxic effects, determined by quantification of extracellular LDH, were not observed at concentrations of 10 µg/ml. First investigations of cellular signaling with molecular biological methods showed that the polysaccharides, which increased the cellular proliferation, enhanced the expression of FGF-7 (keratinocyte growth factor), FGFR-2 (keratinocyte growth factor receptor) and the insulin receptor.

Additionally some natural products not belonging to the group of carbohydrates were also tested for a bioactivity on human keratinocytes. Oligomeric galloylated procyanidins stimulated the proliferation and cell viability. An aqueous extract of Matico leafs boosted the differentiation. Zinc sulfate and zinc histidin exhibited different effects on proliferation and cell viability of NHK and HaCaT keratinocytes.