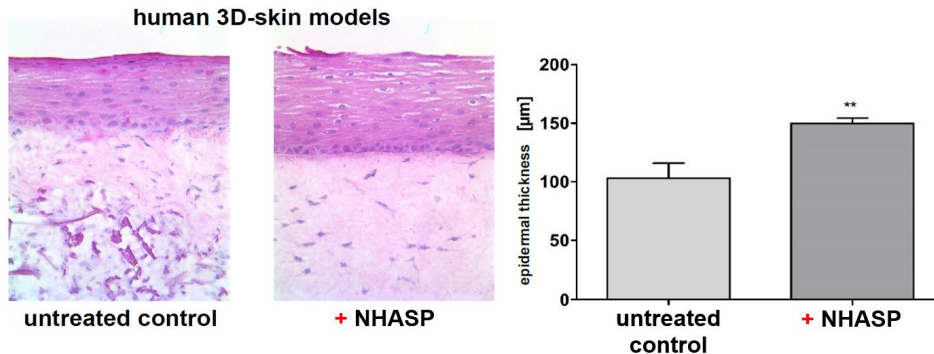


## RWTH Technology

### Natural Hyaluronic Acid Stabilizer



#### Challenge

Hyaluronic acid (HA), an extracellular glycosaminoglycan of usually high molecular mass, is distributed widely throughout connective, epithelial, and neural tissues. As one of the major components of the extracellular matrix HA is involved in a variety of physiological functions such as maintaining tissue hydration and osmotic balance as well as in cell proliferation, migration and adhesion so that HA is crucial for e.g. tissue repair. Natural production of HA in skin declines with increasing age and its degradation is promoted by environmental factors such as UV irradiation. Consequently, exogenous HA plays a key role in medical, cosmetic and aesthetic applications. In the field of aesthetic dermatology HA has become the most popular agent for intradermal and subcutaneous injections to treat e.g. wrinkles, scars and loss of volume. In addition, HA can be used to treat dry skin, atopic dermatitis and osteoarthritis, and it is a frequently used ingredient of skin creams, ointments and serums for topical applications. However, the duration of action of exogenous HA is determined by the time span of its degradation. HA in preparations for skin injections is therefore often combined with other agents or crosslinked using synthetic linkers to stabilize the molecule. Other application specific disadvantages exist, for example intradermal injections of high-molecular HA can lead to formation of intradermal depots visible for days after the injection.

#### Solution

HA-binding proteins (HABP) are able to bind to HA to form large complexes. These HA-HABP complexes regulate many aspects of cell behavior. Members of the inter-a-trypsin inhibitory (ITI) protein family play a special role among the HABPs as they are able to covalently bind to HA – in contrast to all other HABPs so far identified. The presented invention discloses a certain member of the ITI protein family that is specifically expressed in skin. It was found that this protein is crucial for *in-vivo* constitution of epidermal differentiation (see figures above) and reduces *in-vitro* the degradation of HA mediated by reactive oxygen species. Studies in 3D skin models also revealed that intradermal injection of this protein enhances the biological effects of the HA naturally formed in the skin similar to injections of chemically cross-linked HA preparations. These effects show that the disclosed protein is a natural HA stabilizing protein (“NHASP”) and is a completely novel treatment approach in basically all fields of HA application.

#### Advantages

- NHASP is produced naturally in the body ⇒ No immune reaction expected
- NHASP stabilizes natural HA ⇒ HA degradation is reduced
- Interaction of NHASP and HA has anti-inflammatory effects
- Potentially advantageous for basically all fields of HA application

#### Status

- International patent application (PCT) filed and patent application at the German Patent and Trade Mark Office filed
- Several proof of concept *in-vitro* studies (e.g. toxicology studies) successful

RWTH Aachen University is looking for partners for patent exploitation

RWTH Innovation GmbH

RWTH Technology  
#00070

#### Fields of Application

Dry Skin/Atopic Dermatitis, Aesthetics, Cosmetics, Arthritis

#### Key Words

#Hyaluronic Acid, #Hyaluronan, #Glycosaminoglycan, #Tissue Repair, #Dry Skin, #Aesthetics, #Dermal Filler, #Cosmetics, #Osteoarthritis

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