<table>
<thead>
<tr>
<th>Title</th>
<th>Phenotype of human epidermis with sIL-1ra deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author(s)</td>
<td>Ku, Chee Wai</td>
</tr>
<tr>
<td>Citation</td>
<td>Ku, C. W. (2007, March). Phenotype of human epidermis with sIL-1ra deficiency. Presented at Discover URECA @ NTU poster exhibition and competition, Nanyang Technological University, Singapore.</td>
</tr>
<tr>
<td>Date</td>
<td>2007</td>
</tr>
<tr>
<td>URL</td>
<td><a href="http://hdl.handle.net/10220/8989">http://hdl.handle.net/10220/8989</a></td>
</tr>
<tr>
<td>Rights</td>
<td>© 2007 The Author(s).</td>
</tr>
</tbody>
</table>
**Introduction**

Skin is the largest organ in the body and it serves as a protective barrier. It is made up of an outermost epidermal layer and an underlying dermal layer (Fig 1). The formation and maintenance of the epidermis depend on the precise regulation of keratinocyte proliferation, differentiation and apoptosis. This homeostasis relies on the network of cytokines and growth factors. Perturbation of this homeostasis leads to inflammatory skin diseases and cancer development.

Interleukin-1 (IL-1) is a pro-inflammatory cytokine that is constitutively produced by keratinocytes. It is also involved in the proliferation and differentiation of keratinocytes. IL-1 binds to its cognate receptor and can trigger downstream pathways with different outcomes. sIL-1ra binds to IL-1 receptor and prevents the transmission of intracellular response. However, the phenotype of human epidermis when the underlying fibroblast cells is deficient of sIL-1ra remains unclear.

**Aims**

To generate secreted interleukin-1 receptor antagonist (sIL-1ra) knockdown in human fibroblast cells by RNA interference and investigate the phenotype of sIL-1ra deficient human epidermis using an organotypic coculture.

**Methods**

To generate secreted interleukin-1 receptor antagonist (sIL-1ra) knockdown in human fibroblast cells by RNA interference and investigate the phenotype of sIL-1ra deficient human epidermis using an organotypic coculture.

**Results**

![PCR screening for positive clones](image1)

![Real-time PCR quantitation for the mRNA level of sIL-1ra in normal fibroblast and fibroblast knockdowns](image2)

**Discussion**

Fibroblasts deficient in sIL-1ra significantly increases epidermal proliferation and impaired cellular differentiation. In the absence of sIL-1ra, the pro-survival influence of IL-1 on the keratinocytes was dominant, leading to a disruption of normal skin homeostasis. These results revealed for the first time the impact of IL-1 signalling on epithelial-mesenchymal communication. Thus, sIL-1ra plays a pivotal role in maintaining the delicate balance between cell proliferation and apoptosis. The implications are far-reaching, considering that the dysregulation of this balance has an essential role in many developmental processes and contributes to the etiology of many pathological diseases, such as cancer.

School of Biological Sciences
Project Title: Phenotype of human epidermis with sIL-1ra deficiency
Student: Ku Chee Wai
Supervisor: Dr Tan Nguan Soon
Collaborators: Prof Walter Wahl, Dr Liliane Michalik (Center for Integrative Genomics, Switzerland)