Reconstitution of a Multilayered And Stratified Epidermis by Human Eccrine Sweat Gland Derived Cells
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Introduction
Human sweat glands are considered a possible stem cell source for epidermal keratinocytes. We hypothesized that human eccrine sweat gland cells can contribute to the in vitro generation and in vivo function of engineered dermo-epidermal skin substitutes.

Materials and Methods
We used organotypic cultures (Pontiggia et.) consisting of a dermal part containing human fibroblasts and of a stratified epidermal substitute formed either by epidermal keratinocytes or by sweat gland cells respectively. These substitutes were transplanted onto immuno-incompetent rats (Montaño et al.) and their competence to develop into a functional, stratified epidermis was evaluated.

Results
We show the capability of human eccrine sweat gland cells to form a multilayered stratified interfollicular epidermal substitute ‘de novo’ on collagen hydrogels. In this respect we observed (1) a stratified epidermis consisting of 10 -12 cell layers is formed by sweat gland derived cells. (2) A pronounced stratum corneum develops and is maintained after its transplantation onto immuno-incompetent rats. (3) Junctional complexes and hemidesmosomes are readily and regularly established. (4) Cell proliferation in the basal layer reaches homeostatic levels. (5) The sweat gland derived epidermis is anchored by hemidesmosomes within a well developed basal lamina. (6) Palmo-plantar or mucosal markers are not expressed in the sweat gland derived epidermis.

Discussion and Conclusions
Our data suggest that human eccrine sweat glands are an additional source of keratinocytes that can generate a stratified epidermis. Therefore, human sweat gland cells can be used in autologous dermo-epidermal skin grafts for the treatment of severe burn injuries where there is a tremendous demand for the patient’s own cells.

References

Disclosures
The authors declare no conflict of interest.