

Project Title: Reconstructing pigmented skin

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<http://cedoc.unl.pt/molecular-mechanisms-of-disease/>

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Location of research lab/research center: CEDOC, Lisboa

Summary:

The aim of this project is to develop a 3D human skin model to investigate the regulatory mechanisms involved in skin pigmentation and evaluate transdermal gene and drug delivery. The skin is an essential organ to our survival. Diseases that affect the skin (eg. pigmentation disorders, burns, chronic wounds and skin cancer) are common and in some cases require an allograft. Since the demand for skin tissue largely exceeds the supply there is a substantial waiting list. Considering the risk of graft rejection these patients have to go on immune-suppressants for the rest of their lives. Thus, there is an unquestionable need for developing autologous skin equivalents that could be expanded *ex vivo* and then grafted as a personalized regenerative medicine approach. Another application of skin substitutes is their use as replacement for animal testing to the cosmetic and dermatology industry. A third application is to study the molecular mechanisms that regulate skin pigmentation and melanocyte-keratinocyte interactions.

The project to be developed will include the following tasks;

1. Establishment of 3D primary cultures.
2. Morphologic, biochemical and lipid composition evaluation.
3. Barrier studies.
4. Pigmentation studies.
5. Gene delivery studies.

Bibliographic references:

1. Rab11b mediates melanin transfer between donor melanocytes and acceptor keratinocytes via coupled exo/endocytosis. Tarafder AK, Bolasco G, Correia MS, Pereira FJ, Iannone L, Hume AN, Kirkpatrick N, Picardo M, Torrisi MR, Rodrigues IP, Ramalho JS, Futter CE, Barral DC, Seabra MC. *J Invest Dermatol.* 2014 Apr;134(4):1056-66. doi: 10.1038/jid.2013.432. Epub 2013 Oct 18. PMID: 24141907
2. Melanin transferred to keratinocytes resides in non-degradative endocytic compartments. Correia MS, Moreiras H, Pereira FJC, Neto MV, Festas TC, Tarafder AK, Ramalho JS, Seabra MC, Barral DC. *J Invest Dermatol.* 2017 Oct 23. pii: S0022-202X(17)33065-8. doi: 10.1016/j.jid.2017.09.042. [Epub ahead of print]. PMID: 29074272