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Dynamic Skin Cooling with Non-Toxic Cryogen with Minimal Global Warming Potential

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BACKGROUND

An important issue in laser treatment of cutaneous lesions is to protect the epidermis from thermal damage. This heating, which is primarily caused by light absorption in the melanosomes, can easily bring the temperatures of the basal layer above the threshold damage value of 65-70 degrees C. Pre-cooling of the epidermal basal layer from the ambient value of 35 degrees C to 0 degrees C increases the optical radiant exposure that can be safely delivered by a factor of two. Currently, selective epidermal cooling can be obtained by using a liquid spray of the cryogen R-134A (tetrafluoroethane) for 30-100 ms immediately before laser exposure. However, R-134A has a Global Warming Potential of 1,300 (GWP) and will soon be banned as refrigerant in Europe with the possibility of a future ban in the U.S. Thus a low GWP value substitute is needed.

TECHNOLOGY DESCRIPTION

Researchers at UCI's Beckman Laser Institute have developed a method of delivery and use of a non-toxic, low (0) GWP substitute for R-134 that both cools the epidermis as needed and actually reduces pain of laser treatment beyond that achieved by the traditional R-134 coolant. The method and coolant are also delivered at a lower cost than R-134 and is compatible with low global warming potential requirements.

APPLICATIONS

Laser therapy, skin rejuvenation, hair removal.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,050,117	06/09/2015	2007-032

CONTACT

Doug Crawford
doug.crawford@uci.edu
tel: 949-824-2405.



OTHER INFORMATION

CATEGORIZED AS

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