BAPRAS
British Association of Plastic Reconstructive and Aesthetic Surgeons

BAPRAS Paton-Masser Memorial Fund Report Form

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Project title:	Cellular mechanism of wound healing by autologous skin grafts
Grant holder:	Muholan Kanapathy
Institution:	Royal Free Hospital/UCL
Co-applicants:	
Supervisor (if relevant):	Prof Ash Mosahebi

Date of award:	January 2017			
Grant awarded:	Clinical (tick box)		Lab research (tick box)	/
Interim/ final report:	Interim (tick box)		Final (tick box)	/
Study timeframe:	Start date	1 March 2017	Expected/actual completion date	1 October 2018
Lay Summary:	Wound coverage by split-thickness skin graft (SSG) and epidermal graft (EG) shortens healing time, with comparable outcomes. However, the healing mechanism of EG is not as well understood as SSG. The difference in the healing mechanisms of EG and SSG was investigated using gap junctional proteins, proliferative marker, and cytokeratin markers.			
Summary of progress:	Laboratory analysis was completed in a timely manner as per plan. The study has been completed. The final manuscript is now published and available open access.			
Key findings:	Paired punch biopsies were taken from the wound edge and wound bed from patients undergoing EG and SSG at weeks 0 and 1 to investigate wound edge keratinocyte migratory activities (connexins 43, 30, and 26), wound bed activation (Ki67), and the presence of graft integration to the wound bed (cytokeratins 14 and 6). Twenty-four paired biopsies were taken at weeks 0 and 1 (EG, n = 12; SSG, n = 12). Wound edge biopsies demonstrated down-regulation of connexins 43 ($P = .023$) and 30 ($P = .027$) after EG, indicating accelerated healing from the wound edge. At week 1, increased expression of Ki67 ($P < .05$) was seen after EG, indicating activation of cells within the wound bed. Keratinocytes expressing cytokeratins 6 and 14 were observed			

	on all wounds treated with SSG but were absent at week 1 after EG, indicating the absence of graft integration following EG.
Key issues:	N/A

What is the relevance and value of this research to BAPRAS?	This study has advanced our knowledge on the difference in the mechanism of healing between EG and SSG. This study highlighted that despite EG and SSG both being autologous skin grafts, they demonstrate different mechanisms of wound healing. EG accelerates wound healing from the wound edges and activates the wound bed despite not integrating into the wound bed at week 1 post-grafting as opposed to SSG, hence demonstrating properties comparable with a bioactive dressing instead of a skin substitute.
Presentations from this work?	The data was presented at BAPRAS Winter Scientific Meeting 2017 President's Prize session.
Publications from this work?	**Citation:** Kanapathy M, Hachach-Haram N, Bystrzonowski N, Becker DL, Mosahebi A, Richards T. Epidermal graft encourages wound healing by down-regulation of gap junctional protein and activation of wound bed without graft integration as opposed to split-thickness skin graft. Int Wound J. 2021 Mar 9. doi: 10.1111/iwj.13536. Epub ahead of print. PMID: 33751815.
Future scope of work? e.g additional funding.	To undertake study to elucidation of the differences in the molecular mechanisms for wound healing between EG and SSG.
Any further Comments?	N/A
Signature of award recipient:	
Print name:	Muholan Kanapathy
Date of submission:	27/07/2021