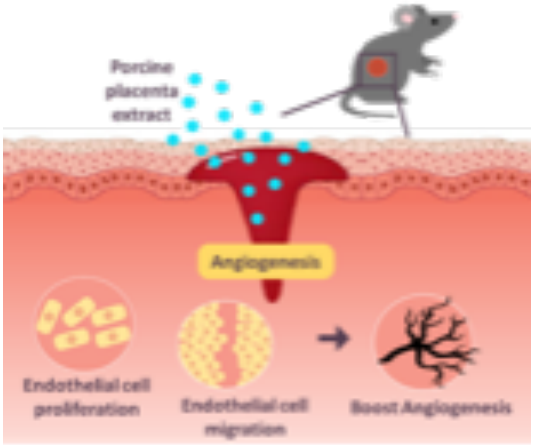
The effect of porcine placenta extract on cutaneous wound healing in endothelial cells and rat model

Nutthamon Kijchalao[1], Worawat Songjang[2], Arunya Jiraviriyakul[2], Rutaiwan Tohtong[3], Tuangporn Suthiphongchai[3] and Suchada Phimsen[1,*]

[1] Department of Biochemistry, Faculty of Medical Science, Naresuan University, Phitsanulok 65000, Thailand.
[2] Department of Medical Technology, Faculty of Allied Health Sciences, Naresuan University, Phitsanulok65000, Thailand
[3] Department of Biochemistry, Faculty of Science, Mahidol University, Bangkok 10400, Thailand
* Corresponding author: suchadaph@nu.ac.th

Abstract: Cutaneous wound healing remains a clinical challenge in the world, which causes several damages to the mental and physical health of patients. Newly formed blood vessels or angiogenesis are essential for tissue repair since they can support cells at the wound site with nutrition and oxygen. Human placenta, a reservoir enriched with bioactive substances such as growth factors, hormones and cytokines, has been used on wound healing such as burns, chronic ulcers, and skin defects. However, due to safety, availability and cost concerns, interest recently shifted toward animal placentas. In this study, we investigated the effect of porcine placenta extract (PPE) obtained from Thai industrial farm on wound healing *in vitro* and *in vivo*. In endothelial EA.hy926 cells, PPE significantly promoted cell proliferation in a dose dependent manner as demonstrated by MTT. Next, in a scratch wound healing assay, PPE treated cells colonized the wound area faster than control untreated cells indicating the increase of migratory abilities. PPE also activated the Phospho-P44/42 MAPK (Erk1/2) in EA.hy926 cells. Furthermore, Full-thickness excision wound in Sprague Dawley rat model were conducted to investigate effect of PPE. The results revealed that PPE significantly accelerated wound healing rate compared with the control. Finally, histological examination found that PPE significantly enhanced wound thickness and blood vessel formation compared with the non-PPE treatment. From these results, PPE exhibits the wound healing activities by promoting angiogenesis both *in vitro* and *in vivo*, suggesting the potential application of PPE for wound healing and angiogenesis-related regenerative medicine.

Graphical abstract:



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