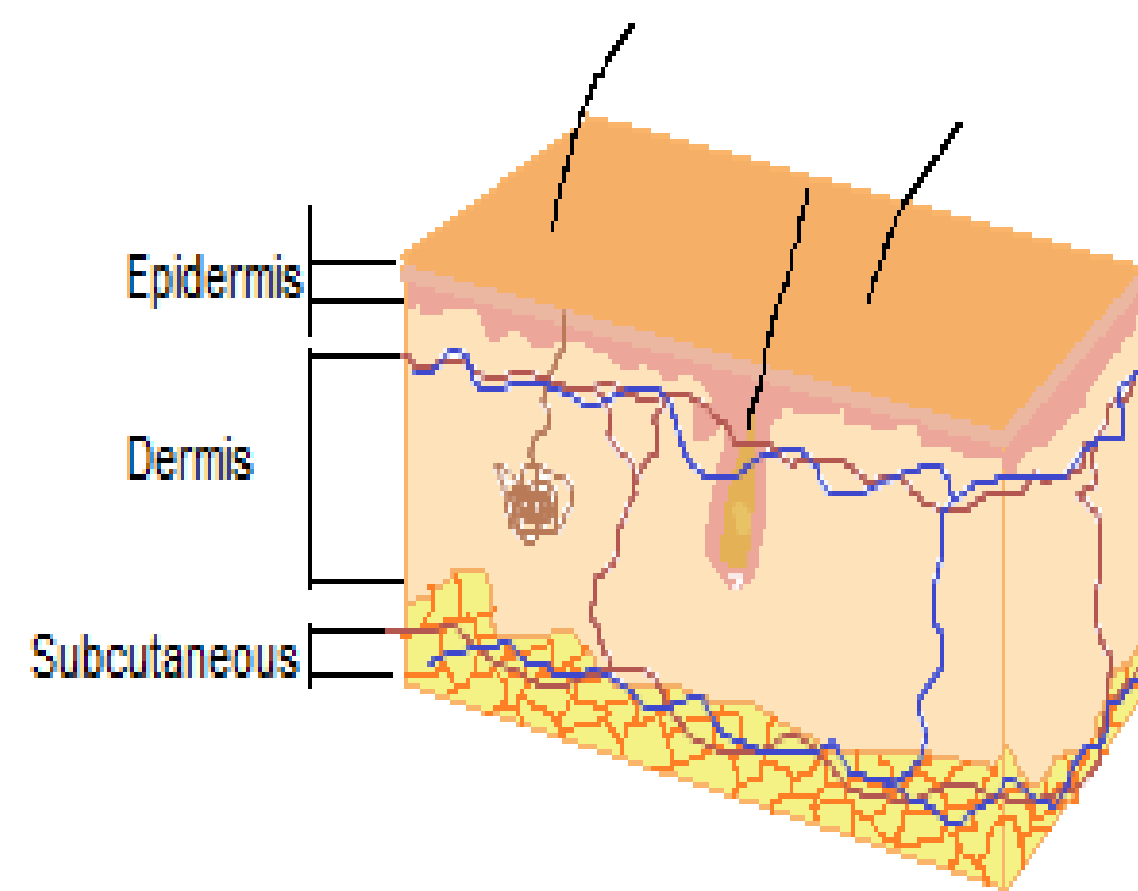


The role of skin metabolism, UV radiation and exposure to parabens in generation of reactive oxygen species

Introduction

Parabens are used in a wide range of skincare products such as suntan lotions, after-sun and also as a preservative. The main interest is the potential interaction of UV radiation and the skin. Products that are used for topical sun protection could have other potential biological interactions.

The skin contains enzymes such as carboxylesterases and has two important layers to act as a barrier.

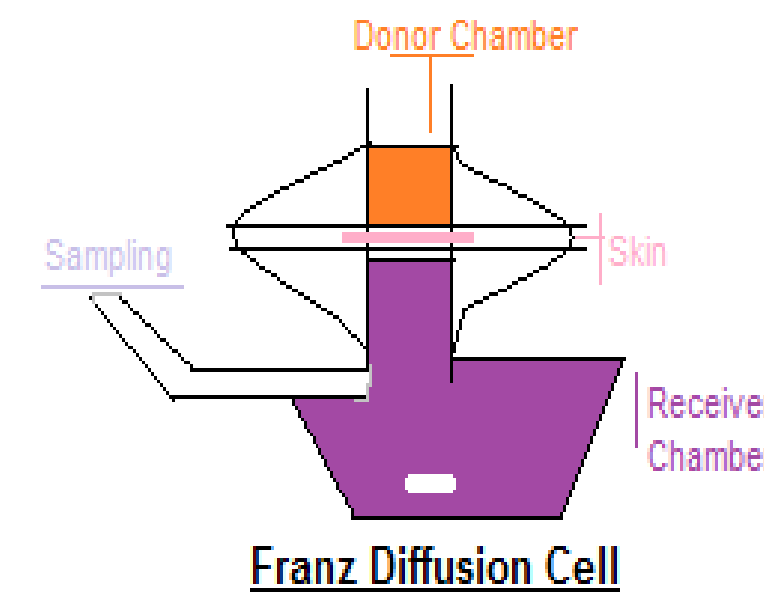


The uppermost skin is called the epidermis which is categorised into 5 horizontal layers. These keep water soluble chemicals out. The stratum corneum is a layer of dead keratinocytes. The skin below the epidermis is the dermis, which consists of collagen and elastin, providing structural support and also moisture via capillaries.

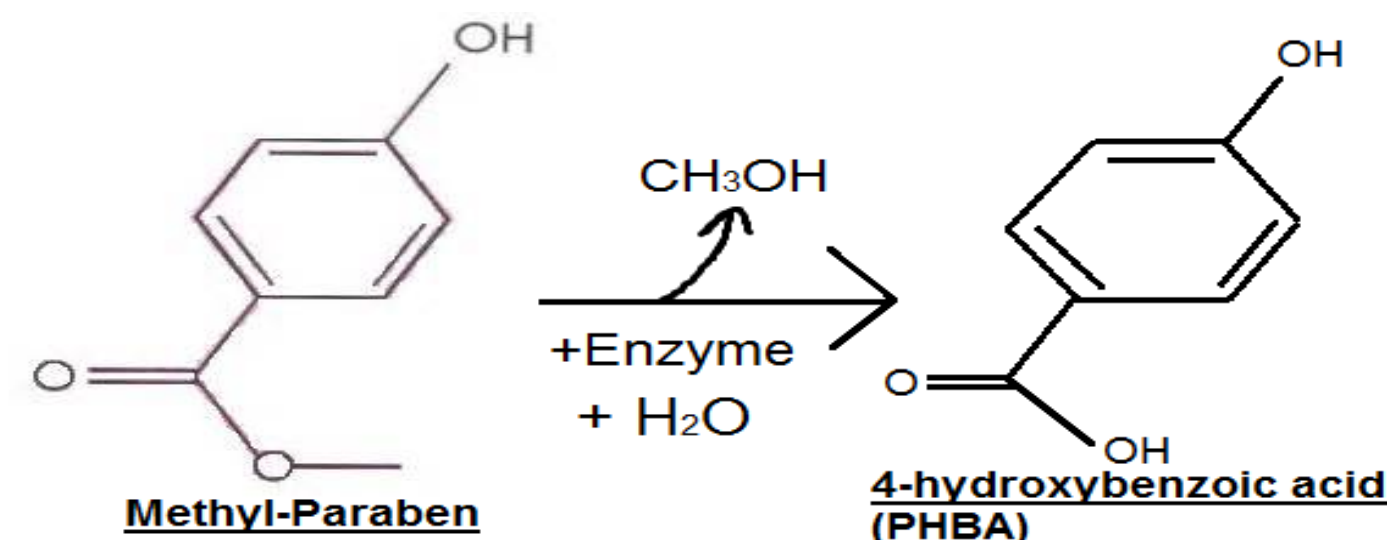
To replicate the qualities of human skin, ex vivo porcine (pig) skin was used, to be a topical cutaneous model. The porcine skin was then exposed to paraben and its esters as part of the experiment. This was done to measure rates of absorption, metabolism and discern if parabens potentiate cancer.

Methods

Porcine skin was first dermatomed. The skin is cut into strips after being defrosted. The stratum corneum must be intact. It is then cut to size to fit a Franz Diffusion cell donor chamber.



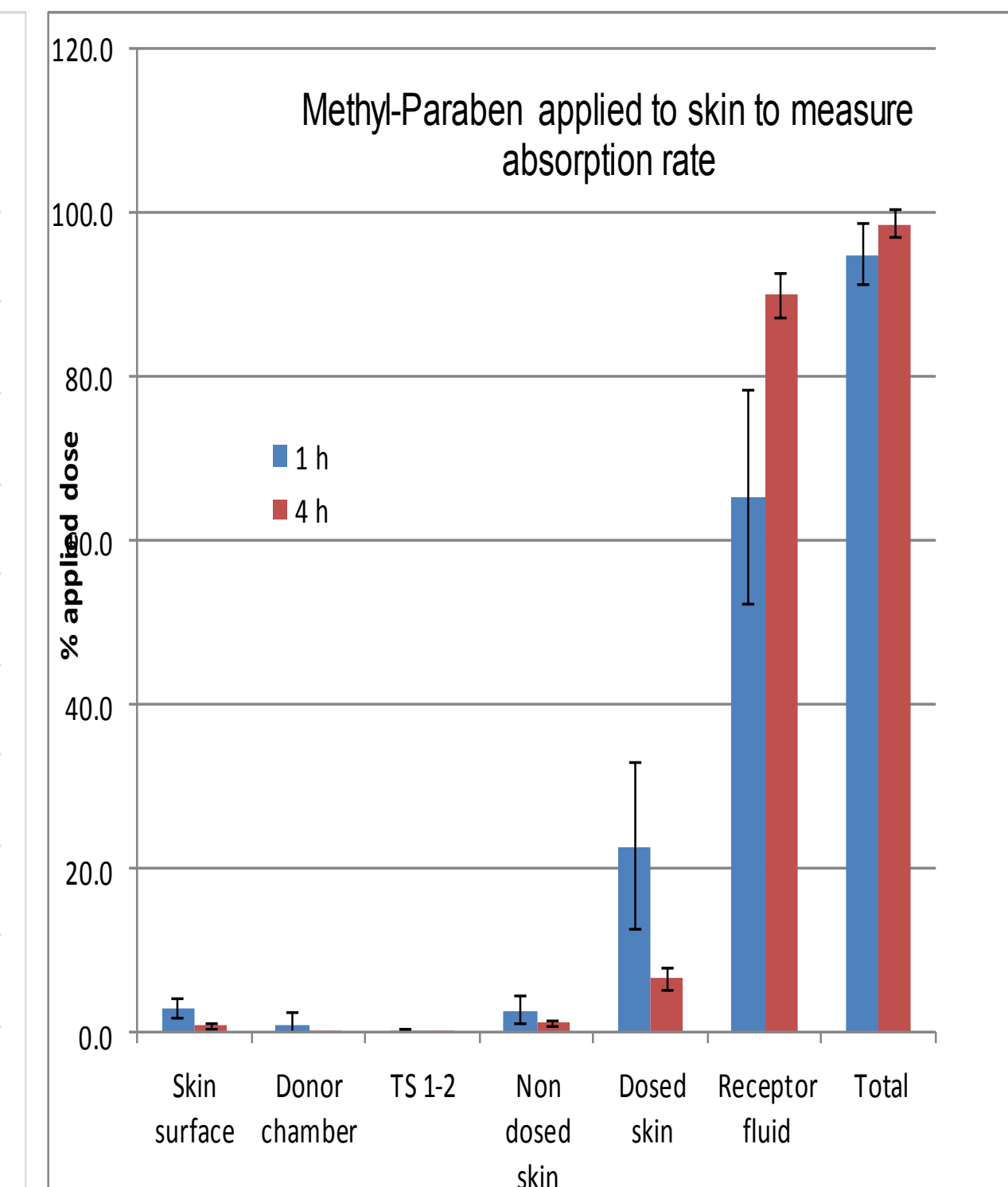
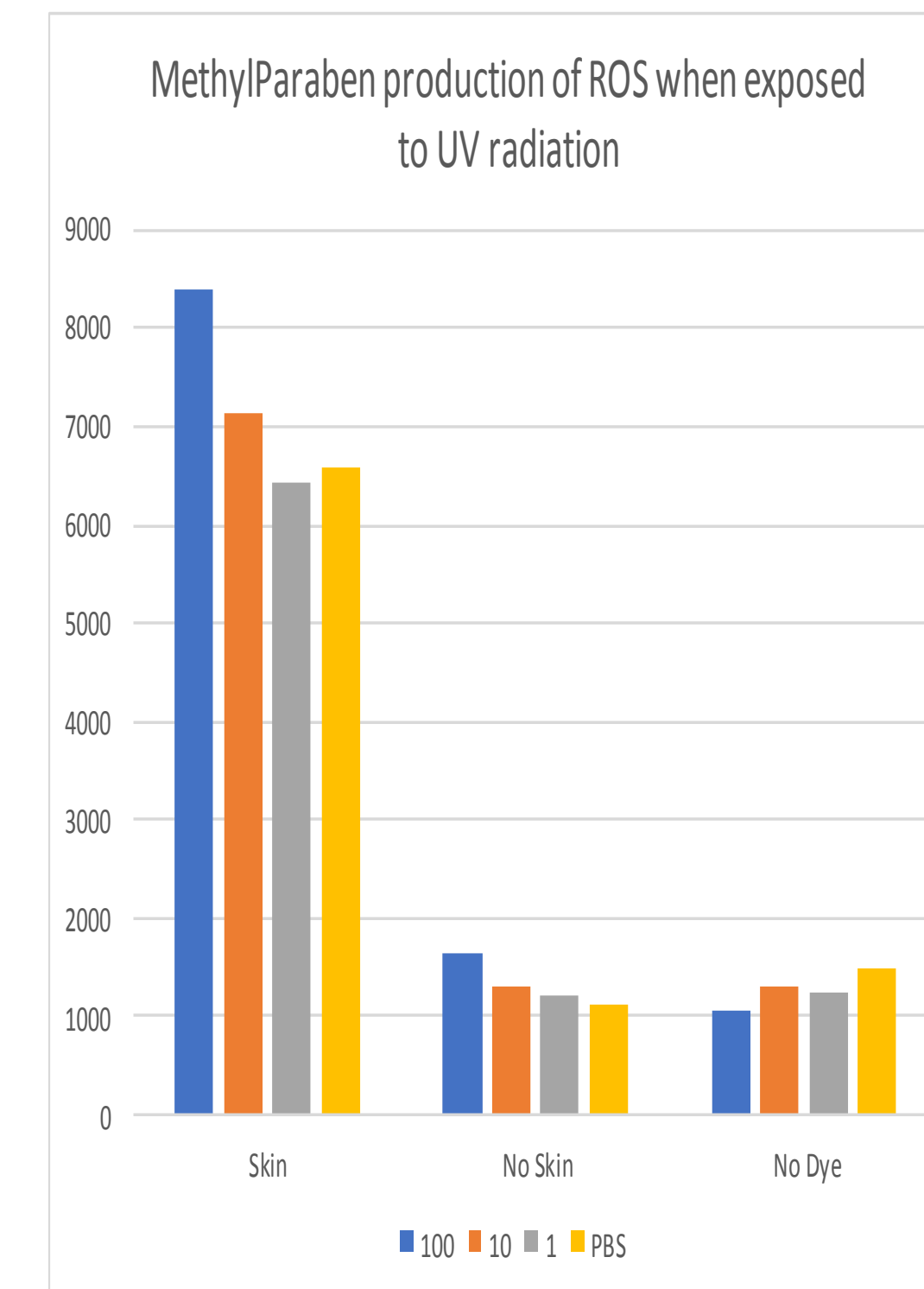
In the receptor chamber there is Minimum essential medium alongside sodium bicarbonate and Gentomycin. This is receptor fluid underneath the skin disc. Parabens were labelled and added to skin. Undosed skin were used as controls. Both were digested for counting/solid phase extraction.



The purpose of solid phase extraction was to try discern how much of the methyl-paraben is catalysed by skin carboxylesterases.

Methyl-paraben, butyl-paraben, PHBA and PBS were added to plates with skin that was conditioned to heat and moisture. Liquid was removed and placed into 96 well plates for reading. Two plates under varied UV radiation (UVA or UVB) and One plate without radiation. DCFDA was used to measure ROS.

Results



Discussion

Parabens are shown to be highly absorptive and are also metabolised by skin enzymes. A donor effect was seen in which absorption varied significantly between two skin models. No chemical or dose concentration effect was seen with data collected to show increase of reactive oxygen species or potentiation of cancer. Auto-fluorescence occurred causing erratic results. Future experiments

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