



## BAD Elective Prize/Project Grant Report - Winter 2018: Melanin has a small inhibitory effect on cutaneous vitamin D synthesis: a comparison of extreme phenotypes

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### Project Location:

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### Abstract of Project:

#### Introduction:

Epidemiological data suggest that melanin inhibits cutaneous synthesis of vitamin D<sub>3</sub> by solar ultraviolet radiation (UVR). Laboratory investigations that have assessed the role of melanin on vitamin D production have given contradictory results.

#### Method:

We have determined the protective properties of melanin on vitamin D<sub>3</sub> photosynthesis by terrestrial solar range UVR. This was done on healthy young volunteers (n = 102 including controls) of Fitzpatrick skin types II, III, IV, V and VI, using a broadband or a narrowband UVB source. Each volunteer, irrespective of skin type, was exposed to a fixed sub-erythematous UVR dose to 85% body surface area. This was done 3-5 times with intervals of 3-4 days between UVR exposures. Blood was taken before, during and after the irradiations and assessed for serum 25(OH)D<sub>3</sub> as a marker of vitamin D<sub>3</sub> status.

#### Results:

All participants showed highly significant ( $p \leq 7.7 \times 10^{-11}$ ) linear UVR dose-dependent increases in 25(OH)D<sub>3</sub>. The ratio of regression slopes of the different skin type groups were compared, and only skin type II was significantly steeper than the other groups. Comparisons between skin types II and V/VI showed melanin protection factors of about 1.3 – 1.4, depending on UVR source.

#### Conclusion:

We conclude that melanin offers very limited protection against vitamin D<sub>3</sub> synthesis.

## Reflection:

I am extremely grateful to have been given the opportunity to partake in this project. It provided an exceptional platform for me to develop my core research skills whilst enabling me to express my interest in dermatology and solidify my desire to pursue it as a career.

The topic of the project was fascinating given the implications it may have on a common and increasingly important vitamin deficiency. This is exemplified by the support from the Department of Health in funding this work. Thus, I aim to contribute to sharing the insights from this work on wider platforms moving forward, in the hope that it will improve understanding and management of vitamin D deficiency. This will be helped by the grant provided by BAD.

My contribution to the project enabled me to familiarise myself with managing, organising and analysing large amounts of data. Conducting statistical analysis and understanding the parameters that deem a result significant is an important skill set not only for future project work but also in evaluating literature and determining clinical opinions on how best to treat patients.

Conducting literature reviews provided an insight into how to assess the validity of an article. It also demonstrated the range of research methodology and statistical analysis that can be used. This is important when designing studies, something that I will seek to do following my experience in this project.

Research discipline was another key takeaway from this project. This is primarily in terms of organisation and storage of data, references and files and mitigating version control when multiple people are working on a single document. As projects can span years and involve numerous people, the work produced requires constant monitoring and efficient storage to ensure the quality of data is not compromised and is easily accessible for use at any point in time.

The final area of insight from this project was the publication process. This work will be submitted for publication soon and I will be a co-author. With numerous authors, variation in requirements between journals and pressure/requirements from sponsors, the publication process can be complex and heavily bureaucratic. The publication process is time consuming and can require multiple amendments or submissions prior to publication, at this point patience and perseverance is key. Gaining familiarity with the process has been very useful in enabling swifter progression through it in the future.

I would like to thank the BAD for providing their grant to me for this project. I would also like to thank Professor Young for providing guidance and support throughout the project and without whom it would not have been possible.