

https://dspace.org/

Inability of methylene blue to protect the enamel organ against vitamin E deficiency

Irving, J T

1954

http://hdl.handle.net/10539/19935

Irving, J. T. 1954. Inability of methylene blue to protect the enamel organ against vitamin E deficiency. South African journal of medical sciences; 19(3):107

Downloaded from a DSpace repository. https://dspace.org/

S.Afr. J. med. Sci. (1954), **19**, 107–114.

PROCEEDINGS OF THE NINTH MEETING OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY, 26th MAY, 1954

Inability of Methylene Blue to Protect the Enamel Organ Against Vitamin E Deficiency, *by J. T. Irving (Joint Dental Research Unit of the Council for Scientific and Industrial Research and the University of the Witwatersrand, Johannesburg).*

Aaes-Jorgensen *et al.* [1951] have stated that methylene blue will prevent dental depigmentation in rats on Vitamin E-free diets. However, in a recent report Moore *et al.* [1953] found that the inclusion of methylene blue in a Vitamin E-deficient diet fed to rats did not protect the incisor teeth against depigmentation, though many of the other lesions associated with Vitamin E deficiency were prevented. Through the kindness of Dr. Moore and his colleagues, the present writer was able to examine microscopically the incisor teeth of rats subjected to various procedures. The basic Vitamin E-free diet was essentially the one previously described [Moore and Wang, 1947]. The rats examined were as follows: one negative control, two positive controls which received 1 mg. of DL α-tocopherol acetate weekly by mouth, and two animals on the Vitamin E-free diet which contained 0·126 per cent methylene blue from the beginning of the experiment. The animals were on these diets for about one year.

The colour of the upper incisor teeth was noted before histological preparation. The positive control rats' teeth were of the normal orange colour, and those of the negative control were china white. The teeth of the methylene blue rats were either white or had yellow patches or were much paler than usual.

The enamel organ in the positive control teeth was microscopically entirely normal. That of the negative control rat showed marked degeneration of the type already described [Irving, 1942; Pindborg, 1950, 1952]. The teeth of the animals on the methylene blue diet showed qualitatively the same changes as those of the negative control animal. The changes were not quite so advanced, but were severe enough for one to conclude that methylene blue exerted a negligible protective effect on the enamel organ.

Depigmentation of the incisor teeth in both Vitamin A and Vitamin E deficiency has been explained as due to removal of the pigment by macrophages after degeneration of the enamel organ which normally exercises a protective function [Irving, 1952]. The enamel organ needs more than redox substances for its maintenance. The same applies to the protection of the testis against atrophy and the prevention of resorption gestations. Thus Vitamin E has a protective action on cellular survival not shared by methylene blue, but methylene blue can replace Vitamin E in certain biochemical changes.

REFERENCES

Aaes-Jorgensen, E., Dam, H. and Granados, H. (1951). *Acta pharm. tox. Kbh.*, 7, 171.
Irving, J. T. (1942). *Nature*, **150**, 122.
Irving, J. T. (1952). *Nature*, **170**, 573.
Moore, T., Sharman, I. M. and Ward, R. J. (1953). *Biochem. J.*, **53**, 31P.
Moore, T. and Wang, Y. L. (1947). *Brit. J. Nutrit.*, **1**, 53.
Pindborg, J. J. (1950). *J. dent. Res.*, **29**, 212.
Pindborg, J. J. (1952). *J. dent. Res.*, **31**, 805.