

Radioprotective Effect of Hydrocortison and Prednisolon on the *Vicia faba equina*

Do corticosteroids have a protective effect against X-rays? This problem, which we consider to be of great theoretical and practical value, has not been studied sufficiently.

All our attempts¹ to demonstrate the existence of a protective effect of corticosteroids in guinea-pigs, by employing various corticosteroids, administering them in different ways and using several tests (depilation test, acanthosis test)^{2,3}, were in vein. In contrast to this, with the plant *Vicia faba equina*²⁻⁴, employing JÜNGLING's test⁵ which consists of observing the appearance and development of the secondary roots after application of X-rays, we were able to demonstrate that the hemisuccinate of hydrocortison had a very distinct protective effect against X-rays. We have also shown that this protective effect was not due to the succinate part, since the succinate of sodium has a very minimal protective effect.

To test whether other corticosteroids also had a protective effect on *V. faba equina*, we slightly modified our experimental procedure in order to study the effect of prednisolon (as hemisuccinate) and compare it with that of hydrocortison. After germination in water, the shoots presenting a primary root of about 2 cm are placed

in contact with 0.001 molar solutions of these corticosteroids for 3 days (solution renewed twice within 24 h) and subsequently exposed to an X-ray dose of 250 R (app. Therapix C 100 - 55 kV, 5 mA, filter 0.78 mm Al, FSO 30 cm, loc. Ø 12 cm, irradiation time = 4 min 12 sec), and then replaced in water. The appearance and development of secondary roots is then observed for 30 days. The results are compared with controls, untreated and non-irradiated plants on the one hand and with plants having received 250 R without further treatment on the other.

Figure 1 (1) confirms the protective effect of hydrocortison in these new experimental conditions. (2) It shows that in an equimolecular concentration (0.001 M), prednisolon, which differs from hydrocortison only by the loss of 2 hydrogen atoms replaced by a double bond, has a protective effect which is superior to that of hydrocortison.

Figure 2 shows that in a 4-times higher concentration (0.004 M), hydrocortison has approximately the same protective effect as prednisolon in a concentration 4-times lower (0.001 M).

It seems that this effect corresponds to the therapeutic effect of these corticosteroids, prednisolon being about 4-5 times more active than hydrocortison (tablets of hydrocortison dosed at 20 mg and those of prednisolon at 5 mg). We consider it important to underline this parallelism⁶.

Résumé. Avec le *Vicia faba* test, nous avons pu démontrer l'effet radioprotecteur de l'hydrocortison et de la prednisolone. L'effet radioprotecteur de la prednisolone est grosso modo, 4 fois plus important que celui de l'hydrocortison.

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University Clinic of Dermatology, Genève
(Switzerland), 9 August 1967.

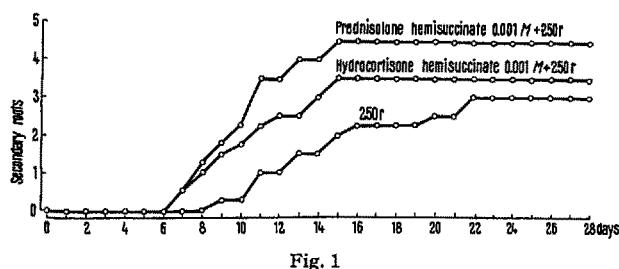


Fig. 1

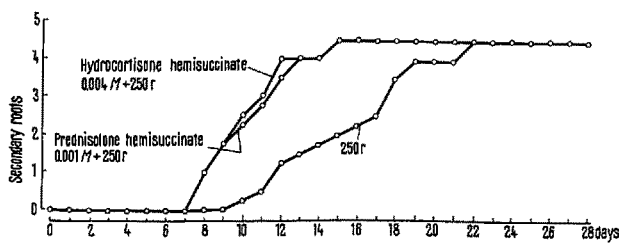


Fig. 2

¹ H. LOZERON and A. MAGGIORA, *Dermatologica* 131, 28 (1965).

² A. MAGGIORA, H. LOZERON, E. BUJARD and W. JADASSOHN, *Prog. Biochem. Pharmac.* (Karger, Basel, New York 1965), vol. 1, p. 528.

³ A. MAGGIORA, H. LOZERON and W. JADASSOHN, *Strahlentherapie* 129, 438 (1966).

⁴ H. LOZERON, A. MAGGIORA and W. JADASSOHN, *Internationales Symposium Grächen, Wallis 1965* (Karger, Basel/New York 1966), p. 25.

⁵ O. JÜNGLING, *Münchener med. Wschr.* 40, 1141 (1920).

⁶ This work was made possible by a subsidy from the Swiss National Fund for Scientific Research.

Mitochondrial Swelling Induced by Diphtheria Toxin in vivo: A Comparison with the Action of some other Bacterial Toxins

In some recent papers it has been shown that diphtheria toxin induces a mitochondrial swelling in chicken embryo heart cell cultures¹ and in other primary cell cultures, while the mitochondria of some established cell lines, as HeLa cells and RC 37 cells, are unaffected². This swelling is prevented by antitoxin³ and by some blocking agents of the respiratory chain as KCN, NaN₃ and Amytal. A

complete reversal effect, within certain limits, is promoted by ATP and seroalbumin³.

These findings support the assumption that the mitochondrial swelling induced by diphtheria toxin in vivo is due to toxin per se and is an active, electron transport dependent swelling³.

¹ F. PARADISI, *Experientia* 22, 373 (1966).

² F. PARADISI, *Pathologia Microbiol.* 30, 481 (1967).

³ F. PARADISI, *Experientia* 23, 742 (1967).