Preliminary and Short Report

Studies on Tyrosinase Reaction

I. A New Method of Activating the Tyrosinase Reaction

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Fitzpatrick and his collaborators (1, 2) showed that the melanocytes of human skin are activated by radiant energy (ultraviolet rays, thorium-x, and X-rays) and these cells are able to form melanin when irradiated human skin slices are incubated with tyrosine. But sulfhydryl inhibitors, sodium arsenite and iodoacetamid, failed to remove the inhibition of tyrosinase which occurs in normal skin.

The present authors studied the effect of several chemical substances on the tyrosinase reaction (Fitzpatrick) when they are injected intracutaneously, and confirmed that copper sulfate and estrogen (3) can activate the tyrosinase reaction.

Procedure

One per cent solution of copper sulfate is injected intracutaneously to unirradiated human skin. The skin is removed two hours after injection. The tyrosinase reaction (Fitzpatrick et al.) is then carried out.

Fig. 1. Melanocytes in unirradiated human skin which was intracutaneously injected with copper sulfate and incubated in tyrosine phosphate buffer. (a, X320; b, X1200)

Result

A positive reaction consists of the darkening of the entire protoplasm of a cell, including the dendrites (Fig. 1). These cells correspond to the melanocytes demonstrated in the irradiated human skin by routine tyrosinase reaction (Fig. 2). The palisade basal, other epidermal cells and histiocytic cells in the dermis do not show positive reaction.

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Fig. 2. Melanocytes in human skin which has been exposed in vivo to ultraviolet radiant energy and incubated in tyrosine phosphate buffer. (Mag. X1200)

Copper sulfate was incubated with normal human skin prior to incubation with tyrosine. This procedure did not produce a positive reaction.

Estrogen (Estrodin-B) intracutaneously injected instead of copper sulfate, presented positive reaction in a case out of four cases examined.

SUMMARY AND CONCLUSION

It was demonstrated that copper sulfate and estrogen intracutaneously injected to unirradiated human skin can activate the tyrosinase reaction histochemically.

Many histochemical and biochemical studies are now necessary in order to investigate the meaning and mechanism concerned.

REFERENCES

