seems to have been approximately 70-fold in each case. It probably reflects the initial loss of particles from 33/ml. to 22/ml. due to filtration. There is also a difference between the irradiation times necessary to produce maximum increase. The maximum effect was observed in 6 min. when the whole culture was irradiated and 3 min. when the filtrate was irradiated. This difference is possibly due to the masking effect of the bacterial cells during irradiation of the whole culture. The activation obtained is very much greater than that shown by Garen and Zinder[3] using bacteriophage from *Salmonella typhi-murium*. They demonstrated approximately a six-fold increase in transduction following ultra-violet irradiation.

J. S. Loutit

Microbiology Department,
University of Otago,
Dunedin.
Sept. 17.

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Synthesis of Deoxyribonucleic Acid in Adult *Drosophila*

It is well known that thymidine labelled with hydrogen-3 provides a very accurate means for mapping synthesis of deoxyribonucleic acid in cell nuclei[1]. In an attempt to confirm by this method earlier conclusions drawn from work with phosphorus-32 regarding the length of time required for the maturation of sperm in *Drosophila melanogaster*[2], observations were made on synthesis of deoxyribonucleic acid in the fly in general.

Two types of experiment were performed. In the first, flies aged less than 3 hr. after eclosion were injected with about 0·05 μl. labelled thymidine (Schwartz Laboratories, New York) of about 0·9 mc. per ml. (and about 180 mc./m*M*). Flies were killed at daily intervals, up to 9 days after treatment. On the basis of findings in this experiment, a second series was performed where flies were similarly injected at from less than 2 hr. to 3 days after eclosion, and killed 24 hr. after treatment. The distribution of tritium was studied by means of stripping film autoradiographs[3], made with Kodak *AR*–10 over 5–7 μ paraffin sections. The exposure time was about three weeks.

In the first series, positive autoradiographs were found over nearly all nuclei in the imaginal fat body, showing that these cells continue their synthesis of deoxyribonucleic acid for at least some hours after eclosion. Positive reaction was also found over the nuclei of large sections of the midgut. Exact grain-counts were not made, since the range of the tritium β-particles is too short for quantitative studies in sections; but over many nuclei 25–30 grains above background were seen. Muscle cells, brain cells, pericardial cells, gave no arginine nor did all but a very few cells in the Malpighian tubules, the ectodermal fore-gut and hind-gut, and accessory glands of the testis. The primary and secondary spermatogonia gave weak autoradiographs in flies killed during the first day or two after eclosion, and this could be followed with difficulty in secondary spermatogonia and spermatocytes on the following days, but definite grain accumulation over spermatids and sperm was not established.

In the second series, positive autoradiographs of the same magnitude (25–40 grains per nucleus) were seen over gut and fat body cells in groups of flies injected during the first 3 hr. after eclosion. The grain count over fat body nuclei in flies injected 9 hr. after eclosion is about the same; but in fewer nuclei, while the number of labelled cells in the gut appears to be the same as in younger flies. At 12 hr. after eclosion few nuclei in fat body and mid gut show autoradiographs, and at 24 hr. the grain count is in both tissues down to about 10–15 in the few remaining positive nuclei. The somatic tissues of flies injected 3 days after emergence give negative reaction. In this series, autoradiographs over primary and secondary spermatogonia were seen to be much stronger in flies injected 24 hr. or 3 days after eclosion, than in flies treated 2 or 3 hr. after eclosion.

These results show that there is a considerable amount of synthesis of deoxyribonucleic acid going on in the somatic cells of the fly during its first 12 hr. of adult life. This leads to a competition for the labelled precursor so that the tagging of the germ cells is not nearly as heavy as would be expected. In experiments where a limited amount of precursor is administered for the purpose of incorporation into the deoxyribonucleic acid of germ cells, in physiological or genetical studies, it therefore appears more efficient to use 24 hr. old flies, than newly ecloded ones.

On the other hand, this material (or possibly one of the larger species of Diptera, for example, *Musca domestica*) should provide a very useful tool for biochemists interested in the effect of different agents, for example, radiation, on the process of metabolism of deoxyribonucleic acid, since there are no mitoses in these cells, the synthesis of deoxyribonucleic acid most probably being connected with the establishment of polyteny of the fat body and mid-gut chromosomes. In some other often-used materials, such as rat small intestine or regenerating liver, the influence of the agent to be tested on the process of cell division may lead to difficulties in the interpretation of data[4].

The results also serve to demonstrate that in some respects the adult *Drosophila* is not necessarily a fully developed, static system, and this may be of importance in some experiments.

Per Oftedal

Norsk Hydro's Institute for Cancer Research,
Radiumhospitalet, Norway.
Aug. 7.

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BIOLOGY

Discrimination Between Ebb and Flood Tide in Migrating Elvers (*Anguilla vulgaris* Turt.) by Means of Olfactory Perception

In a previous communication on the behaviour of elvers in the Dutch Wadden Sea[1] it was pointed out that the animals most probably use the tidal streams for their migration from the open sea to inland water. They are carried inward by the flood at higher water levels, and go down to the bottom during the ebb tide so that they are not carried back seaward. This means that elvers should be able to discriminate between ebb and flood tide. The suggestion was made that this discrimination was based on changes in salinity during the tidal cycle.

In laboratory experiments, however, no conclusive preference for fresh or brackish water over sea-water was found. In part of the experiments the elvers