Lateral UV irradiation to the centrifuged *Chironomus* eggs and their photoreversion*

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Developmental types expected by centrifugation can be modified by the subsequent uv irradiation (Kalthoff *et al.*, 1982; Yajima, 1982). By early irradiation to the anterior end of eggs centrifuged at two pole cell stage from 30′ to 90′ after the centrifugation, expected normal larvae (NL) and double cephalon (DC) were modified into double abdomen (DA) and inverted embryo (IE), respectively, whereas by late irradiation at 120′ after the centrifugation, NL was modified into DC, but DC was not.

As to the cause for changing the modified types, I have proposed that either (i) it is due to occurrence of some qualitative change of uv target with the development (Yajima, 1982) or (ii) a part of redistributing cytoplasm which was first accumulated into opposite posterior half of egg by centrifugation was irradiated simultaneously with the anterior yolky end (Yajima, 1983).

In the present study, in order to establish which one of the above propositions is a cause for changing the modified results, uv irradiation to the anterior yolky end or clear cytoplasmic zone from the lateral side at different irradiated stages and their photoreversion were examined.

First, uv irradiation to the anterior 1/4 (yolky end) from the lateral side by shielding the posterior 3/4 with a piece of deck glass from uv, taking care not to expose the rim of cytoplasmic zone adjoining the posterior innerface of yolk zone, were compared between two irradiated stages, at 30′ and 120′ after the centrifugation. There were no significant differences of developmental results between the early and late irradiation and the uv damages did not photorecover; that is, both early and late irradiation of centrifuged eggs, yielding DC at 24%, induce DA at 25% and IE at 15%, respectively. These results from early irradiation were similar to the results of anterior irradiation in parallel to the long axis of egg, that is, the irradiation of centrifuged eggs, yielding DC at 30%, at 30′ after the centrifugation induce IE at 25% and DA at 40%. However, the above results of lateral irradiation at 120′ after the centrifugation do not agree with these after the parallel irradiation at the same stage in which DC were induced at 40%, IE at 11% and DA at 22%. Furthermore, since the differences of developmental results between late lateral and parallel irradiation should be due to whether a part of clear cytoplasmic zone is irradiated with the anterior yolk or not. Following lateral irradiation to the clear cytoplasmic zone at early stage was performed to examine there are uv targets in the cytoplasmic zone which damage at the early stage causes the occurrence of DC. Early lateral irradiation to the cytoplasmic zone, yielding DC at 9%, causes occurrence of DC at 30% and the uv effect is photoreversible.

From the above results, change of modification of centrifuged results with the development by uv irradiation to the anterior end in parallel to the long axis of egg may be ascribed to that early uv irradiation causes only a damage to the anterior yolky end of centrifuged egg and late irradiation injured the tip of redistributing cytoplasm as well as the yolky end. Furthermore, present experiment of photoreversion of uv effect to the centrifuged egg has revealed that there remains targets for the induction of DA and IE after the centrifugation in the anterior end, which do not photorecover and that photoreversible uv targets for the induction of DC are accumulated in the clear cytoplasmic zone by the centrifugation.

References

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* Full content of this paper may be seen in the article entitled;

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