tion accelerates the loss of the aldehyde component required for the luciferase reaction. The enzyme thus escapes inactivation from radiation as well as from its catalysis of light production. Since the latter is an oxidative reaction, it is indeed curious that the enzyme can withstand oxidative destruction from radiation but not from the oxidative chemical steps it catalyzes (*6*).

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12 October 1961

Changes in Titer of Ecdysone in Bombyx mori during Metamorphosis

Abstract. The amount of ecdysone extracted from *Bombyx mori* rose precipitously immediately before, and fell immediately after, transition from the larval to the pupal stage, and thereafter a secondary rise in titer was observed. These observations correlate very well with physiologic sequences of metamorphosis, critical period, and oxygen uptake.

Ablation and transplantation experiments have demonstrated clearly that metamorphosis in insects is under hormonal control. Both Fukuda (*1*) and Williams (*2*) were able to demonstrate that the growth and differentiation hormone is secreted by the prothoracic gland and that this gland is activated by neurosecretion from the brain (*3*). Recently, Kobayashi and Burdette (*4*) have demonstrated synergism between ecdysone and brain hormone, a finding which indicates a direct action of the latter in addition to its tropic function. By means of a modification of the method of Butenandt and Karlson (*5*) to isolate ecdysone, the level of this hormone in the tissues has been followed before and after pupation in samples of *Bombyx mori* (*6*).

Samples (*7*) of full-grown larvae, silkworms in the prepupal stage, and silkworms at 1, 2, 3 to 4, 5 to 6, and 6 to 7 days of age (*8*) were procured in large enough quantities to assure a yield of active hormone. The *Calliphora* test was used for bioassaying the material, and different concentrations were tested until activity was detected or until the amount of crude extract was so great as to preclude additional injection because of the discrepancy in size between the *Calliphora* larvae and the volume to be injected.

Activity was obtained in the bioassays in five of the seven samples. The results are indicated in Table 1. No hormone was detected in full-grown larvae, and the greatest amount was found during the prepupal stage. The amount of hormone then declined until the pupae were 2 days of age, when the sample was not active. Activity was found again in subsequent samples.

When the activity is calculated on the basis of the number of *Calliphora* units per gram (wet weight) of tissue, it is found that approximately 6 *Calliphora* units per gram were present immediately before pupal moulting. When the titer is calculated in terms of the mean wet weight of *Bombyx* at this stage, it is found that 8 units were extracted from each silkworm of this strain. For an accurate expression of actual level of hormone at a given stage, the number of units should be multiplied by a constant, *K*, which takes into consideration the efficiency of the extraction procedure.

When one considers the titer of hormone in relation to the life cycle of the insect, it is apparent that metamorphosis occurs shortly after a large amount of hormone is secreted, and that afterward the level of hormone falls rapidly. A more gradual increase in the secretion of hormone then occurs, presumably preparatory to emergence. The critical period in *Bombyx* and the oxygen uptake also fall into a logical sequence with respect to the observed changes in titer of ecdysone (*9*).

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Table 1. Titer of ecdysone during metamorphosis of *Bombyx mori*.

Stage (25°C equivalent)	Wet weight (g)		Yield of crude hormone (g)	Bioassays (No.)	Maximum pupation (%)	C.U.*	
	Total sample	Mean				Per gram	Per silkworm
Full-grown larvae	4589.4	2.589	0.1760	8	25	I†	I†
Prepupae	7061.0	1.359	0.0655	3	56	5.8	7.9
1 day	6865.3	1.113	0.0628	3	67	1.9	2.1
2 days	7498.8	1.118	0.0628	6	35	I	I
3–4 days	7026.7	1.243	0.1230	4	80	3.7	4.6
5–6 days	7164.2	1.142	0.1339	6	59	1.6	1.8
6–7 days	7111.2	1.213	0.1064	4	80	3.1	3.7

**Calliphora* units. †Inactive.

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6. This study was aided by a grant from the National Institutes of Health (Department of Health, Education, and Welfare) and by the American Cancer Society. The technical assistance of Nick Wiser and Diane Beitel is gratefully acknowledged.
7. The samples were obtained through the courtesy of the Gunze Trading Co.
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27 October 1961

Prezygotic Selection in ABO Blood Groups

Abstract. A statistical method was devised to test whether prezygotic selection was operating in ABO blood groups, and it was demonstrated, with data from Japanese families, that heterozygous AO and BO fathers transmitted more than 50 percent O-bearing sperm (approximately 55 percent) to their children. Neither sperm incompatibility nor reproductive compensation could account for the results.

Selective mechanisms operating on ABO blood groups have so far been found to act only at postzygotic stages (*1*), while little attention has been paid to prezygotic selection, for which evidence is reported here.

Three different mechanisms of prezygotic selection are possible: (i) meiotic drive (*2*) or unequal production of gametes carrying different alleles in heterozygous parents; (ii) sperm competition, occurring independently of female genotype; (iii) sperm competition as a result of serological incompatibility between sperm carrying the A or B gene and the anti-A or anti-B antibody in the uterine secretion (*3*). The first two possible mechanisms occur in animals and plants (*4*).