possess the sexual agglutination reaction. This mating mechanism is fairly common among yeasts, especially among species evolved in terms of recent geological time.

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Hormonal Control of Onset of Corneal Reflex in the Frog

In a previous study (1) it was reported that the corneal (wink) reflex is unelicitable in the tadpole until just before the period of metamorphic climax. In *Rana pipens* the onset of the reflex normally precedes forelimb emergence from the branchial chamber by an average of 4 days (range, 0 to 10 days). In *R. catesbeiana* this is also true, except for rare instances of earlier onset. It was further established (*1, 2*) that the onset of the reflex was strictly related to metamorphosis; it never appeared in the nonmetamorphosing hypophysectomized tadpole, and the time of onset could be moved forward by treatment of the whole normal tadpole with thyroxine, but the extent of acceleration was less than for other metamorphic changes. However, local stimulation of the reflex center in the medulla oblongata of large midlarval tadpoles with pellets containing thyroxine produced a premature maturation of the center, as well as an unusually early onset of the reflex; maturation occurred as much as 18 days before forelimb emergence. These results demonstrated the dependence of the reflex center upon thyroid hormone for its final maturation.

It has been shown that the later stages of induced metamorphosis in thyroidless or hypophysectomized tadpoles are passed through progressively more slowly than the early stages, at a constant thyroxine dosage level (*3*), and that successive events or stages of metamorphosis tend to have a higher thyroxine concentration requirement or threshold (*4*). Hence it may be assumed that the later metamorphic event, forelimb emergence, displays a higher threshold than does the onset of the corneal reflex, the earlier metamorphic event.

To test this assumption, concentrations of thyroxine were sought which would in fact permit the establishment of the corneal reflex without concomitantly stimulating the rupture of the skin windows through which the forelimbs emerge. In tests of over 150 *R. pipiens* and a few *R. catesbeiana,* over a large range of thyroxine concentrations in the surrounding water (from 0.002 to 2 μg/lit., water and food being changed daily, with thyroxine added immediately thereafter), the validity of the assumption has been demonstrated in two instances (see data in Table 1 for 108- and 177-day animals). In six other instances a related and very significant lengthening of the interval between the onset of the reflex and forelimb emergence has been recorded. In general, it has been found that, at 25°C, concentrations of *dl*-thyroxine of 0.6 μg/lit. invariably bring about forelimb emergence, if permitted to act for a long enough time. Concentrations of 0.4 μg/lit. rarely produce forelimb emergence, although incipient thinning of the skin-window area is usually obtained. A concentration of 0.2 μg/lit. is insufficient to initiate the corneal reflex or forelimb emergence. At 15°C, even 1.0 μg/lit. is ineffective in producing rupture of the skin window.

The study discussed in this report provides further evidence in support of the belief that most metamorphic changes in the frog tadpole are separable events, capable of being brought about individually by local hormone treatment (*2, 5*), or capable of being separated from succeeding metamorphic events by careful manipulation of hormone concentration and temperature (*6*).

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Table 1. Record of treatment of hypophysectomized tadpoles, demonstrating separability of the onset of the corneal reflex from the emergence of the forelimbs. Thyroxine was added to the water in which the animals were raised.

Species (*Rana*)	Form of thyroxine	Thyroxine concn. (μg/lit.)	Temperature (°C)	Treatment time in days: Before reflex onset	Treatment time in days: Between reflex onset and forelimb emergence
R. pipiens	*dl*	1.0	25	73	41
R. pipiens	*dl*	1.0	15	161	37*
R. pipiens	*dl*	1.0	25	71	45
R. pipiens	*dl*	1.0	25	47	44*
R. pipiens	*l*	0.2	25	71	47
R. pipiens	*l*	0.4	15	170	108*
R. pipiens	*l*	0.4	25	87	43
R. catesbeiana	*dl*	0.4	15	70	177†

* Tadpole died prior to emergence of forelimbs.
† The metamorphic progress came to a complete standstill at 15°C; skin windows thinned only slightly. The tadpole was transferred to a 25°C bath after 164 days; forelimb emergence occurred 13 days later.

Factors Affecting the Relative Deposition of Strontium and Calcium in the Rat

Abstract. Varying the calcium, phosphorus, carbonate, and lactate content of the diet was shown to affect the deposition in bone of Sr^{89} to a degree quite different from concurrent effects on Ca^{45} deposition. The influence of these findings on the evaluation of the Sr^{90} fallout hazard is discussed.

In a recent report in *Science* we presented evidence against the commonly accepted concept that the deposition and retention of Sr^{90} in bone is simply related to the concomitant deposition and retention of calcium (*1*). This concept has been widely employed in the evaluation of the hazard to human beings of Sr^{90} from fallout. We now wish to report further experiments, of an admittedly preliminary nature, which support our earlier position and which suggest an explanation for the varied results which have been reported by investigators in this field (see *2*).

Six groups of four rats each were maintained for 8 days on diets which varied in one or more of the following constituents: calcium, phosphorus, car-