

and died 2 days later, the normal course with fixed virus. On the other hand, rabies fixed virus cultivated in Maitland medium with mouse embryo brain shows no decrease in intracerebral virulence for rabbits; the 47th subculture on mouse embryo brain which had the exceptionally low titre of 100 intracerebral mice units, produced complete paralysis in a rabbit 8 days after inoculation. The reduced virulence for rabbits of the chick embryo virus appears, therefore, to be a specific modification.

Summary. After 47 passages through the developing chick embryo, rabies fixed virus shows no enhanced virulence for the chick embryo, as judged by the complete development of the embryo, the relatively low virus titre in the embryo brain and the scanty pathological changes in the brain. The virulence of the chick embryo passage virus for mice and guinea pigs remained unchanged, while that for rabbits appeared reduced considerably, as demonstrated by the prolonged incubation period, and duration of the infection. The specific antigenic character of the chick embryo virus remained unchanged during 47 passages over a period of 18 months.

11673 P

Identity of Prolactin with Water Drive Factor in *Triturus viridescens*.*

C. S. CHADWICK. (Introduced by J. C. Burch.)

From the Department of Biology, Vanderbilt University, and the Highlands Biological Laboratory, Highlands, N. C.

Reinke and Chadwick have shown that the factor which induces the water drive in the red eft (land phase) of *Triturus viridescens* originates in the anterior lobe of the hypophysis and, further, that this factor acts independently of the thyroid glands and gonads in effecting the water drive.¹ Indicating the possibility that the water drive factor is similar to or identical with the growth-promoting hormone, Chadwick² was able to induce the water drive with injections of a commercial extract of the anterior pituitary which assays

* The Prolactin used in these experiments was very generously provided by Dr. H. W. Rhodehamel of the Eli Lilly Research Laboratories.

¹ Reinke, E. E., and Chadwick, C. S., *PROC. SOC. EXP. BIOL. AND MED.*, 1939, **40**, 691; Reinke, E. E., and Chadwick, C. S., *J. Exp. Zool.*, 1940, **83**, 223.

² Chadwick, C. S., *PROC. SOC. EXP. BIOL. AND MED.*, 1940, **43**, 509.

a high growth-promoting hormone content.[†] This preparation was not as effective, however, as implants of adult *Triturus* pituitaries. In view of the fact that the lactogenic hormone has been demonstrated to exist in the pituitaries of certain Amphibia,[‡] and that it is available commercially in pure form, it was resolved to attempt the induction of the water drive with this preparation. Positive results would not only shed further light on the identity of the water drive factor but would also indicate a function for the lactogenic hormone in at least one species of Amphibia. To accomplish this end, 45 red efts of *Triturus viridescens*, of varying sex and age, were treated with prolactin and set up for observation according to previously described procedures.

The crystalline hormone was prepared for injection by shaking a measured quantity in distilled water and then slowly bringing the temperature to 50° C. When completely dissolved the solution had a slightly brownish color. It was cooled to 18° C and injected intraperitoneally. Each eft was given 1/10 cc of solution, containing approximately 2 mg, at each injection and was injected daily for 7 to 10 days. A fresh solution was made up daily.

Of the 45 efts treated, 26 were normal, 13 were thyroidectomized and 6 gonadectomized. The thyroids and gonads were removed from some efts in order to determine whether or not the prolactin could act independently of these glands in inducing the water drive. The efts were brilliant red in color when the injections were started and their size range was from 65 to 90 mm. Six months to 2 years would have been required for efts in this size range normally to seek a water habitat.

Every eft, irrespective of size or sex, voluntarily sought and entered water within 5 to 10 days after receiving the first injection. Controls did not seek water nor would they remain in it when placed there. Every eft except those previously deprived of their thyroids began molting on the third day of injection and continued to molt at 24 to 48 hour intervals until completely adapted to water. The thyroidectomized efts did not molt. Instead, the cornified layer piled up on the body surface giving the efts a very dry, rust-colored skin condition. On entering water, however, this thick cornified layer absorbed water, swelled and lifted off the underlying living epidermis. Large pieces continually floated off into the water until after 3 days in water much the same skin condition prevailed in the thyroidectomized as in the normal and gonadectomized efts. The change

† Antuitrin Growth, Parke, Davis & Co.

‡ Leblond, C. P., and Noble, G. K., PROC. SOC. EXP. BIOL. AND MED., 1937, **36**, 517.

towards the adult condition in color, *i. e.*, green dorsally and yellow ventrally, the keeling of the tail and general reactions among all the efts given prolactin was so profound that within 3 to 4 weeks they could be distinguished from adult water-stage controls only by their smaller size.

The effect of prolactin on the land phase of *Triturus viridescens* has thus been shown to be identical in every way with that of implants of anterior lobes from adult water stages. So far as is known, the return of *Triturus* to water is essential for reproduction. If prolactin is a normal product of the *Triturus* pituitary and really is the water drive factor then the process of migrating to water for the purpose of reproduction may be considered a total reaction of the organism similar to—or analogous with—the maternal behavior and broodiness which prolactin induces in organisms much higher in the phylogenetic scale. This possibility is quite in line with the statement of Riddle and Bates⁴ that “lactogenesis is a response to prolactin which excites also—in both sexes—additional responses more ancient phylogenetically and more significant generally”.

Summary. Prolactin induces the water drive in normal, thyroidec-tomized or gonadectomized land phases of *Triturus viridescens* within 10 days, irrespective of their size or sex. It induces repeated molting in efts with normal thyroids but not in efts deprived of their thyroids. It causes also the rapid assumption of the adult coloration and finally the appearance of adult structural characteristics.

11674 P

Emulsions of Ethylaminobenzoate as Topical Anesthetics.

R. BEUTNER AND K. R. BEUTNER.

From the Department of Pharmacology, Hahnemann Medical College, Philadelphia.

Ethylamino benzoate, the mother substance of procaine, butyn, and many other local anesthetics, is in itself a valuable surface anesthetic, but is difficult to use on account of its insolubility in water and its inability to form water soluble salts. The solutions in alcohol are too irritant, the solutions in fats too inactive. Attempts were therefore undertaken to use ethyl amino benzoate (also known as benzocaine) in the form of a finely divided suspension in watery colloid solution. However, the use of various hydrophilic colloids

⁴ Riddle, O., and Bates, R. W., *Sex and Internal Secretions*, 1939, 1089.