

TRANSIENT OCCURRENCE OF STEROL ESTERS IN RAT MAMMARY GLAND
DURING INVOLUTION*

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Only in plasma and adrenal glands have sterol esters been shown to be plentiful in adult rats, sterols elsewhere being present predominantly in the free (unesterified) form. It is therefore worthy of note that in the mammary gland during involution a large accumulation of sterol esters occurs.

Stock diet-fed, Long-Evans rats that had suckled 6 to 10 pups for 20 days were killed with ether at various intervals after weaning of their litters. Portions of their mammary glands, sampled at random, were weighed, minced, washed repeatedly with a 0.9% NaCl solution to remove milk, and homogenized in a Waring blender with 30 volumes (v/w) of a 2:1 (v/v) chloroform-methanol mixture. Lipids were extracted (Folch et al., 1957) and fractionated by chromatography on 5-g Unisil columns (Creech and Sewell, 1962). Digitonides were prepared (Sperry and Webb, 1950) from the eluted fractions containing the free and esterified sterols (the latter after saponification), and the sterols were analyzed by the FeCl_3 color reaction (Zlatkis et al., 1953).

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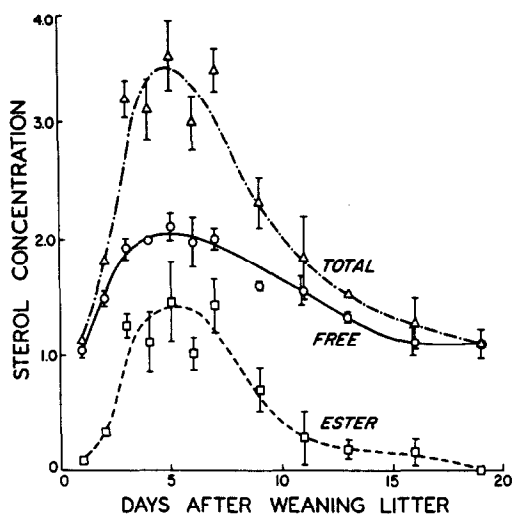


Fig. 1 - Concentrations of Total, Free and Esterified Sterol in Rat Mammary Glands at Various Periods after Weaning of the Litters - Sterol concentrations are expressed as mg sterols per g mammary gland. Average values and standard errors are given. The numbers of rats used are given in Table I.

The total sterol concentration in the mammary gland rose rapidly for the first three days after the litter was weaned (Fig. 1). This rise consisted mainly of sterol esters; the free sterol concentration increased to a lesser extent. A rapid decrease of total sterol concentration then occurred between the sixth and tenth day after weaning, and again the change in concentration of total sterols was mainly the result of a change in the sterol ester concentration of the gland (Fig. 1).

The quantitative significance of the sterol ester accumulation in the involuting mammary gland can be further evaluated from Table I. During the first three days after

TABLE I

STEROL ESTER CONTENT OF TOTAL STEROLS IN
THE INVOLUTING MAMMARY GLAND

The sterol ester contents of mammary glands of rats killed at various periods after their litters had been weaned are expressed as percentages of the total sterol contents of the glands. Mean values and standard errors are given.

Days after weaning litter	Number of rats	Per cent sterol ester
0*	18*	<1*
1	5	8.1 \pm 0.8
2	5	17.9 \pm 1.8
3	4	39.6 \pm 2.0
4	2	35.7 \pm 3.1
5	5	39.6 \pm 6.4
6	3	33.9 \pm 3.9
7	5	39.2 \pm 4.0
9	5	30.7 \pm 4.9
11	2	13.1 \pm 10.7
13	8	10.4 \pm 4.3
16	2	11.7 \pm 6.4
19	3	0

* Rats lactating for 15 to 20 days and nursing at least 6 pups.

the litter had been weaned, the sterol ester content rose from less than 1% to about 40% as the amounts of total sterols present increased. From then, until about seven days after weaning, the proportion of sterols in the esterified form did not change. Finally, between 7 and 19 days after weaning, the sterol ester concentration dwindled to insignificant proportions.

The finding that the disappearance of total sterols from the mammary gland after weaning the litter coincided in time with the most rapid loss of sterol esters from the gland indicates that lipids in the form of sterol esters are transported away from the mammary gland during involution. An

interesting parallel may be drawn between the occurrence of sterol esters in the involuting mammary gland and in the brain undergoing demyelination (Brante, 1949). Since in both brain and lactating mammary gland, sterols exist almost exclusively in the free form, the appearance of sterol esters when these tissues undergo degradative changes suggests an involvement of sterol esterification in the mobilization of lipid constituents from these tissues.

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