TABLE II. Solubilization of Particulates as Measured by I^{131} Activity of Non-Dialyzable, Streptomycin Precipitable Material.

	4% desoxycholate	Excess n-butyl alcohol	
	No. 1	No. 1	No. 2
Cpm soluble	17760	9450	7953
Cpm unfractionated particulate preparation	423620	423620	292035
% soluble	4.2	2.2	2.7
% insoluble or dialyzed	95.8	97.8	97.3

the mode of action of a particular hormone will be information which indicates where and how the metabolism of the target cell is controlled by the hormone. These studies appear to implicate the pentosenucleoprotein of the cytoplasmic particulates as being important in the action of the lactogenic hormone on the secretory cells of the mammary gland. Little is known of the function of the nucleic acid and nucleoprotein of the cytoplasm but it has appeared that they are involved in the synthetic processes of the cell, particularly those in which the cytoplasmic particulates are involved. It may be postulated that the association of the lactogenic hormone with the cytoplasmic particulate nucleoprotein results in changing the conditions of enzyme attachment to the particulate nucleoprotein or in changing the activity of the enzymes which are already in association with the nucleoprotein. Such changed conditions of enzyme attachment, affecting the enzymatic composition or activity of the cytoplasmic particulates, could result in changing the direction of the synthetic activity of the cell as occurs with the initiation of lactation.

Summary. Studies have been carried out with lactogenic hormone labeled with radioactive iodine in pseudo-pregnant rabbit mammary gland which indicate that the labeled hormone becomes associated with the cytoplasmic particulate nucleoprotein. Other data suggests that the particulate lipids are probably not involved in the lactogenic hormone-particulate association. These findings have been discussed in terms of their relation to the shift in synthesis which occurs in the mammary gland with the initiation of lactation.

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Carbon and Water Contents of Mouse and Rat Tissues. (22090)

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In reporting tissue analyses for radiocarbon, tracer chemists have employed a wide variety of units (*e.g.* per cent of injected dose, specific activity of tissue carbon, total activity per organ, activity per unit weight of fresh or dried tissue, etc.). Sometimes the choice is clearly dictated by the immediate context of the measurement; at other times the units are those most conveniently derived from the chosen method of radioassay (*e.g.* specific activity when $BaC^{14}O_3$ is assayed at "infinite thickness"). In analyzing and comparing data from several published sources, the reader must frequently translate from one set of units to another. Adequate information, however, is seldom presented for even an approximate conversion.

Table I records soft-tissue concentrations

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of water and of organic carbon in mice and rats from this laboratory. The data were obtained in the course of a study on the metabolism of C^{14}-labelled atropine(1). All values were presumably influenced by the genetic and nutritional histories of the test animals. Insofar as these mice and rats are representative of those in general laboratory use, the information in Table I makes it possible to transform, among the following reference systems, any C^{14} concentrations which are known in any one of these systems: activity per mol of tissue C, per unit weight of wet (fresh) tissue, or per unit weight of dried tissue. Unlike the water data, the tissue carbon values are thought to be unique in terms of their accuracy and precision (*cf.* 2), illustrating that the carbon method described by one of us(3) is particularly useful for tissue samples.

Materials and methods. The data were derived from 12 male white mice of mixed breed, ranging in body weight from 26.8 to 38.7 g (mean 33.3 g), and from 12 male albino rats with body weights between 106 and 153 g (mean 128 g). The rats were obtained from a colony bred in these laboratories(4) from an original Wistar strain. After weaning, both mice and rats were maintained on a Purina Rat Chow plus cooked fresh meat and mixed grain (corn and wheat, with oats as a binder) 3 times weekly. They were deprived of food for 24 to 48 hours before sacrifice, but water remained available *ad libitum*. Some of the animals received atropine one-half hour to 24 hours before sacrifice, but these injections had no apparent effect on the results reported here. Animals were killed by chloroform inhalation, and selected tissues were removed promptly for weighing and desiccation. As soon as each organ was dissected free, a weight was quickly obtained on a torsion or knife-edge microbalance. Because evaporation was not controlled, weights of the smaller organs (*e.g.* adrenals, gall bladder) were unreliable, and consequently no values of moisture content are presented for these organs. All tissue samples were dried *in vacuo* (pump operating continuously) over Drierite for a period of 24 hours at room temperature.

TABLE I.* Carbon and Water Contents of Mouse and Rat Tissues.

	Water (% wet wt)		Carbon (% dry wt)	
	Mouse	Rat	Mouse	Rat
Adrenals	—	—	66.2	58.4
Gall bladder & bile	—	—	56.9	—
Pancreas	—	71.6	55.0	53.7
Skin (hair sheared)	—	65.5	54.6	53.7
Spinal cord†	70.7	71.6	59.3	56.9
Medulla & brain stem†	73.3	77.1	55.5	57.1
Cerebellum†	76.8	78.4	55.6	54.1
Cerebrum†	77.2	78.8	54.2	54.5
Liver	70.5	75.6	53.5	52.2
Blood (heart)	—	—	52.6	51.1
Kidneys	74.7	75.7	52.1	51.0
Thymus	76.1	—	53.6	—
Genital apparatus‡	—	75.4	52.2	51.0
Submaxillary gland	—	76.9	52.8	48.6
Parotid gland	—	78.2	—	48.9
Urinary bladder	70.8	74.0	54.2	52.9
Diaphragm	76.4	76.8	52.3	50.4
Heart	75.5	78.2	51.8	49.6
Hamstring muscles	77.0	77.6	51.2	48.4
Stomach§	78.4	78.9	51.8	49.9
Colon & caecum§	79.5	79.4	51.3	49.7
Duodenum & jejunum‖	77.4	77.5	49.5	48.9
Ileum‖	78.2	76.4	48.5	48.5
Lungs	78.3	79.7	51.6	49.4
Spleen	75.8	77.7	49.6	48.6
Testes	82.0	86.2	50.0	48.1
Colonic contents (feces)	—	72.5	37.9	30.5

* Conventional methods (5) were used to calculate stand. deviations for determinations of carbon and water in mice and rats. These 4 stand. deviations were found unexpectedly to be almost equal, namely about 2% units. Because almost every value in the table is based on 12 animals, the estimated stand. error for each of the means is 0.6. The stand. error of the difference between two means in the same column is approximately 0.8.

† The rat data (only) represent here 5 analyses each (stand. error of the difference between means about 1.3).

‡ Genital apparatus included epididymi, vasa deferentia, seminal vesicles, and part of the prostate.

§ Stomach, colon, and caecum were emptied of contents and mucosal surface was gently rinsed with isotonic saline.

‖ Analyses of duodenum, jejunum, and ileum included entrapped secretions and small amounts of chyme.

Only negligible losses of water could be detected during additional periods of desiccation. After reweighing, the specimens were ground to fine powders; aliquots weighing 2 to 25 mg were subjected to high-temperature combustion and analysis by the method of Gabourel, Baker, and Koch(3). Standards (*e.g.* CP sucrose) were burned daily to check the carbon analyses.

Results. Tissue analyses are summarized by the means in Table I. Almost every mouse tissue had a slightly lower water content and higher carbon content than the corresponding rat organ. Within each species, tissues rich in carbon (*e.g.* near the top of Table I) were generally poor in water; the converse was equally true.† From this inverse correlation and from the observation that tissues of grossly fat mice were invariably richer in carbon than those of lean mice, we infer that variations in tissue carbon reflect chiefly differences in the tissue lipid content, relative to the stores of protein and carbohydrate. This impression is supported by the invariably high carbon level in brain (lipid-rich) and in bile and adrenal gland (sterol-rich). Of course any material with a large inorganic ash is correspondingly deficient in carbon (*e.g.* feces). Analyses on gross subdivisions of the central nervous system suggest that concentrations of carbon and water vary progressively and reciprocally along the cerebrospinal axis. Probably these variations among portions of the brain and cord parallel the ratio between carbon-rich white matter and water-rich grey matter.

Summary. Soft-tissue concentrations of organic carbon and of water were measured in male rats and mice. Both the method and results (Table I) are thought to be useful to the radiocarbon biochemist.

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† Because carbon is expressed only in terms of the dry-tissue weight, this inverse correlation is not fatuous.

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Analysis of Micro Quantities of Sweat for Sodium Chloride by Conductivity Method.* (22091)

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The collection and analysis of small quantities of sweat is an important tool in assessing the mineraloid activity of the adrenal cortex. However, the small amounts which are collected by the most practical technics(1) make analysis of the diluted material by flame photometry or chemical means quite difficult. Even if meticulous care is taken to thoroughly clean glassware, small amounts of sodium are extracted from the glass itself(1). To prevent this, the glassware must be silicone coated and the water freshly distilled. Special precautions must be taken in the handling of the unknowns. This imposes further limitations on the value of the sweat test for clinical and investigative use. To obviate the difficulties inherent in the chemical analysis of such dilute quantities of sodium, the use of radioactive sodium has been suggested(2). The concentration of chloride in the sweat increases with the rate of sweating and parallels the concentration of sodium. Either chloride or sodium can be used as a measure of adrenal cortical activity in the absence of an abnormal salt intake. The potassium concentration falls as the perspiration rate increases(3). But the relationship of the fall of potassium to the rise in chloride is a linear one. Because of the linear relationship between the excretion of sodium, potassium and chloride, it seemed feasible to

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