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UPTAKE AND TRANSFER OF FALLOUT I^{131} IN PREGNANT WOMEN*

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The object of this study was to determine the relationship between fall-out I^{131} levels in diet (milk) and in thyroids of newborns and their mothers. To obtain data on these relationships, levels of I^{131} were measured in two series of pregnant women in their last trimester, along with comparison populations during the nuclear testing in 1962. In the first series, studied from April through June, 12 pregnant women and 5 controls were counted weekly in a whole-body counter with an 8" x 4" NaI crystal placed over the thyroid. No detectable levels of I^{131} (>25 pc) were measured in any of the subjects in this series. Ten fetal thyroids obtained from stillborns and counted during this period were also negative for I^{131} . Milk samples counted at this time contained zero or just barely detectable levels of I^{131} .

In the second series, counted during October through December 1962, levels of I^{131} in 6 pregnant women and 5 controls (non-pregnant women) counted weekly ranged from 0 to 160 pc, with a mean of 60 pc (Figs 1 and 2). By January 1963, the I^{131} level in most of the subjects was too low to detect. The variation between individuals at any time is quite large as is the fluctuation in the I^{131} level of any one individual over the course of time. This variation in the I^{131} thyroid level is undoubtedly due, in large measure, to the variation in dietary I^{131} intake primarily in the amount of milk consumption. Further, the I^{131} levels are generally so low that the counting error is also quite large. For an error of less than 10%, a level of I^{131} of 200 pc would

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be required. In five of the offspring of these women measured from 18-34 days after birth, no significant levels of I^{131} could be detected. If the ratio of 1.8 for I^{131} in fetal to maternal thyroids, as proposed by Eisenbud, is applied, the pregnant women would have to have had levels of I^{131} of 300 pc in order to measure significant levels in their newborn offspring, particularly with the decay of activity engendered by the time delay in counting the babies after birth.

The levels in milk collected in this area during this period ranged from 25 to 180 pc per quart (Fig. 2). The variation in the level of I^{131} in milk in samples from a single New York dairy is large and is a function of available fallout I^{131} to grazing herds. The large milk shed supplying this particular dairy results in wide variation in the I^{131} milk level from day to day. Nevertheless, the curve of I^{131} level in numerous samples of milk from one dairy roughly parallels the thyroid levels in the subjects counted (Fig. 2). The peak values in both human thyroids and milk occurred around the 25th of November. Further, the subjects consuming the largest amounts of milk generally had the higher I^{131} thyroid.

With the very low levels observed in these subjects and the uncontrolled nature of the study, it is difficult to draw generalizations. It is clear that, in the second period of fallout, very little I^{131} was taken up by the pregnant women, and apparently not more than by the non-pregnant women. These data also suggest a correlation between milk consumption and thyroid I^{131} content. In the absence of higher levels of fallout, it is likely that data that permit the establishment of the desired quantitative relationships of I^{131} in diet and thyroid will come only from controlled micro-tracer experiments utilizing the ultrasensitive counting techniques illustrated in this study. Certainly, these studies have indicated that if the levels of thyroid I^{131} should reach 250 pc or a level of even the minimal biological significance, they will be readily monitored in a population and with fair accuracy.

FIGURE 1

FIGURE 2