RO1 I

DEPARTMENT OF THE ARMY
WALTER REED ARMY MEDICAL CENTER
WASHINGTON, D.C. 20012

8/12/74
Letter received
8/14/74

REPLY TO
ATTENTION OF:

MEDEC-YHP

SUBJECT: Amendment to USAEC License 08-01738-02

THRU: ~~Commander~~
~~Health Services Command~~
~~ATTN: HSC-PA-H~~
~~Fort Sam Houston, TX 78234~~

HQDA (DASG-HCH-E)
WASH, DC 20314

TO: Director
Division of Materials Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20545

1. Request that Condition 1b of USAEC License 08-01738-02 be amended to permit a one-time use of 100 microcuries each of Iodine-131 and Iodine-125 at the Walter Reed Army Institute of Research Animal Holding Facility, Fort Meade, Anne Arundel County, Maryland, 20755.

2. Radioisotopes will be used in accordance with the attached protocol and statement of MAJ Kenneth D. Burman, MC. (Incl 1).

3. Transfer of radioactive material to and from Fort Meade, Maryland will be accomplished through use of Health Physics vehicle. All waste will be disposed of in accordance with pertinent regulations.

4. Any questions or comments pertaining to this request should be directed to the Health Physics Officer, Walter Reed Army Medical Center, Washington, D.C. 20012 (Telephone: Commercial 202-576-5161; Autovon: 346-5161 or IDS 198-5161).

FOR THE COMMANDER:

for James S. Stockton LTC, MSC

FRED C. BRAND
LTC, MSC
Adjutant

1 Incl
as

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51018

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

REFERENCE OR OFFICE SYMBOL	SUBJECT
SGRD-UWH-B	Use of Isotopes at Fort Meade farm

TO Health Physics

FROM Ken Burman, M.D., MAJ, MC
Dept of Endocrinology and
Metabolism, WRAIR

DATE July 22, 1974

CMT 1

1. An abstract entitled " Sources of Triiodothyronine in Newborn Sheep" has been accepted for presentation at the American Thyroid Society Annual Meeting in St. Louis, Missouri, September 18-21, 1974. This abstract arose from protocol # 042-73 entitled "Secretion of Triiodothyronine from Thyroid Glands of Newborn Sheep" by Kenneth Burman, Leonard Wartofsky, and J.D. Fox.

2. Additional data from this protocol is required in the light of recently reported investigations by other groups. The experiments that will generate this data need to be completed as soon as possible so that the results could be included in the presentation mentioned above.

3. The experiments to be done consist of administering 15-20 microcuries I-125 T3 into an indwelling amniotic fluid catheter and simultaneously administering 15-20 microcuries I 131 T3 into the umbilical vein. Samples will be drawn at one, two, and three, as well as 24 and 48 hours. and analyzed in our laboratory.The studies are under authorization #519(Dr. Leonard Wartofsky).

4. Because of the use of indwelling catheters the surgery on the sheep and their subsequent care can best be performed at the Fort Meade Farm.Dr. Jackson, VC, has consented to help with the experiment and has given his consent to house the sheep at the Fort Meade Farm.

5. Request help and advice from your office in regard to transport and use of isotope in this experiment.

Kenneth Burman

Kenneth D. Burman , M.D.
MAJ, MC
Dept of Endocrinology and Metabolism
ext. 2545

PROTOCOL

TITLE: Secretion of T_3 from Thyroid Gland of Newborn Sheep

MANAGEMENT DATA: Project 3A062110A822, Military Internal Medicine
Task 00, Work Unit 120
Metabolic Response to Disease and Injury

INVESTIGATORS: Kenneth D. Burman, CPT, MC, Leonard Wartofsky, MAJ, MC, and J. D. Fox, CPT, VC.

PURPOSE: To study whether thyroid secretion of triiodothyronine (T_3) is responsible for the low serum T_3 observed in fetal animals.

BACKGROUND:

The initial description of triiodothyronine (T_3) in 1952 (1) was soon followed by evidence for the extra-thyroidal conversion of thyroxine (T_4) to T_3 (2,3). Recent technological advances in the measurement of T_3 have confirmed the physiologic importance of T_4 to T_3 conversion (4-7). Hotelling and Sherwood reported that I_3 concentrations in cord sera were significantly lower than in their paired maternal specimens (8). Their findings have been confirmed in other laboratories (9,10), and recently reviewed (11). Larsen has found a 3-4 fold increase in serum T_3 concentration in humans within the first 24 hours of life, which he believes parallels the increased TSH secretion that has been observed at this time (12,13). The explanation for the low cord T_3 levels is obscure, but might be due to either:

(1) A decreased conversion rate of T_4 to T_3 in the fetus;

(2) An enhanced rate of T_3 disposal unique to the fetoplacental unit; or

(3) To a decreased T_3 secretion rate from the fetal thyroid.

The last possibility is supported by the observation of a rising serum T_3 in the fetus in the first 24-36 hours of life. Moreover, we have recently performed in vitro experiments in rats, the results of which suggest that the mechanism of peripheral T_4 to T_3 conversion in the fetus is probably intact. Unfortunately, the technique used did not permit a definitive answer to this problem, and a different investigational method is needed to elucidate the mechanism causing a low fetal serum T_3 in the fetus. The proposed study will attempt to demonstrate whether postnatal fetal thyroid secretion is the source of the rising serum T_3. This will be done by following measurements of serum T_3 in two groups of animals, in one of which thyroidal secretion has been blocked by iodine administration. If the serum T_3 rises in the control animals in the 24-36 hours after birth, and not in these animals given iodine blockade, then defective fetal thyroid secretion of T_3 will be implicated as the etiology for the low serum T_3 observed in the fetus.

MATERIALS AND METHODS:

Six pregnant sheep will be examined and the date of delivery estimated. About seven days prior to this estimated date of delivery, each sheep will receive an injection of 25-50 μc I^{125} I.V. This I^{125} will not only go into the ewe's thyroid gland, but will also easily flow across the placenta

and will be trapped by the fetal lamb's thyroid gland. Two to three days after this injection, the sheep will be divided into two caregories of three sheep each. Sheep in category A will receive sodium iodide, 1 Gm daily until they deliver. At the time of delivery the newborn lambs from Group A will also receive 1 Gm of sodium iodide to inhibit hormonal (T_4 and T_3) release from their thyroids. Venous blood will be drawn every 6 hours for a 48 hour period. Sheep and lambs in Group B will be similarly studied with the major difference being no iodide administration. All blood will be analyzed for immunoassayable serum T_3 and T_3, protein-bound radioactivity ($PB^{125}I$) as well as TSH. The newborn sheep will be sacrificed and the thyroid glands will be analyzed for radioactive I^{125} content.

By this technique, we hope to show that the animals given iodine blockade will show thyroidal suppression both in the maternal as well as the newborn sheep, and therefore will be unable to normally increase their serum T_3 after delivery. This will then indirectly suggest that the explanation for the low serum T_3 in the fetus is a thyroidal secretion which for unexplained reasons favors T_4 release relative to T_3 release. Measurements of glandular ^{125}I and serum protein-bound ^{125}I (representing T_4-^{125}I and T_3-^{125}I) should confirm the observations made with the stable T_3 measurements.