



# West Virginia School of Osteopathic Medicine

January 24, 1989

Mrs. Carol Connell  
U.S. Nuclear Regulatory Commission, Region II  
Material Licensing Branch  
101 Marietta Street, Suite 2900  
Atlanta, Georgia 30323

Re: amendment of License # 47-19315-01

Dear Mrs. Connell

As we discussed on the phone I wish to amend our license to include one (1) millicurie of Cerium 141 for use in animal research as described in the enclosed protocol. The animals (rats) will be not be returned to the animal quarters after receiving the isotope. They will be sacrificed and stored behind a lead shield in a freezer for a period equal to 10 x the half-life of the isotope. The investigators will wear exposure film badges throughout the course of the experiment.

In addition, please add the following the names to be covered under the license. The record of their training is attached.

John A. Schriefer, Ph.D.  
James W. Nemitz, Ph.D.  
Louise T. Mashburn, Ph.D.  
David E. Brown, Ph.D.

Dr. Kenneth W. Dowler, is no longer on our staff and should be deleted from the license.

In addition, LKB Instruments requires that we be licensed for I129 which is to be used as a calibration standard for our gamma counter. This will be in a sealed vial and will contain 0.0173 uci.

Finally, I have been appointed radiation safety officer to replace Dr. Jozsi Moore who is now a part time employee.

Thank you for your help in all of these matters. We shall look forward to an early approval for the Cerium use.

9002070451 890124  
REG2 LIC30  
47-19315-01 PDR

Sincerely yours,

*Louise T. Mashburn*  
Louise T. Mashburn, Ph.D.

*2/6/89*  
*Feb-1-11*  
*Messin*  
*2/6/89*

FEE EXEMPT

*170.11(a) e*

**PROTOCOL FOR DISTRIBUTION OF C.O.  
USING RADIOACTIVE MICROSPHERES  
Dr. David E. Brown  
West Virginia School of Osteopathic Medicine**

Radioactive microspheres (3M or NEN) will be used in an acute exposure experiment to determine cardiac output and the partitioning of blood flow to most tissues and organs subsequent to stimulation of various central opioid receptor areas of the rat brain. Present research in our laboratory has demonstrated the roles of mu- and kappa-receptors in the nucleus ambiguus and dorsal motor nucleus of the vagus for modulation of HR and MAP (Hassen and Broudy, 1988). The protocol designed here will elicit peripheral circulatory changes occurring upon central opioid receptor stimulation.

Male Sprague-Dawley rats (250-300 g) will be anesthetized and prepared for intraparenchymal injections into specific brain locations as described previously (Hassen and Feuerstein, 1987). A carotid catheter will be inserted for injecting spheres and a femoral catheter will be inserted to the abdominal aorta for constant rate blood withdrawal. Prior to injection of specific opioids, the first radioactive microspheres will be injected while arterial blood will be withdrawn at a constant rate. Approximately 100,000 Ce<sup>141</sup> or Cr<sup>51</sup> labeled microspheres will be injected over 20 sec. Injection of the second label microspheres will begin 5 min after microinjection of an opioid in a specific brain nucleus. All injections of radioactive spheres will follow the protocol for rats outlined by Flaim et al, 1984.

Maximum dosage of any single rat will be 2.5  $\mu$ Ci Ce<sup>141</sup> and 10  $\mu$ Ci Cr<sup>51</sup>. Rats will be maintained under full surgical plane anesthesia and killed by pentobarbital overdose immediately after the second injection of spheres. Dissection for counting of tissue radioactivity will be done on absorbent paper lined trays by personnel wearing disposable gloves. All blood, body tissues and counting tubes will be stored for 10 T<sub>1/2</sub> in a shielded ultralow freezer prior to approved disposal.

No radiation will be present in animal quarters, nor will any animal care personnel be subject to exposure. Only the PI and radiation approved research technicians wearing film badges and TLD rings will handle the radioactive microspheres and rat tissues. The spheres and rats will only be in the two approved radiation rooms belonging to Drs Hassen and Schriefer. Maximum gamma quantities present at any time will not exceed 1mCi for either the Ce or Cr microspheres. Undiluted suspensions of the radioactive spheres will be stored behind lead shielding in a refrigerator approved for radioactive storage.

Flaim, S.F., Nellis, S.H. et al. 1984. J Pharm Methods 11:1-39.  
Hassen, A.H. and Broudy, E.P. 1988. Peptides 9: Suppl. 1, 63-67.  
Hassen, A.H. and Feuerstein, G. 1987. Am J Physiol. 252:H156-H162.

TO BE TYPED

STATEMENT OF TRAINING AND EXPERIENCE

MUST BE TYPED

NAME Louise T. Mashburn

DATE 01/26/83

TYPE OF TRAINING	ON THE JOB (circle)	FORMAL COURSE (circle)	WHERE TRAINED	DURATION OF TRAINING
Principles & practices of radiation protection	<input checked="" type="radio"/> YES <input type="radio"/> NO		Duke University	3 years
		<input checked="" type="radio"/> YES <input type="radio"/> NO	Newcastle Co. Civil Defense (Delaware)	1 month
Radioactivity measurement standardization & monitoring techniques & instruments	<input checked="" type="radio"/> YES <input type="radio"/> NO		University of Virginia Duke University	2 years 3 years
		<input checked="" type="radio"/> YES <input type="radio"/> NO	Newcastle Co. Civil Defense	1 month
Mathematics & calculations basic to the use & measurement of radioactivity	<input checked="" type="radio"/> YES <input type="radio"/> NO		Duke University Newcastle Co. Civil Defense	3 years 1 year
		<input checked="" type="radio"/> YES <input type="radio"/> NO	Newcastle Co. Civil Defense	1 month
Biological effects of radiation	<input checked="" type="radio"/> YES <input type="radio"/> NO		University of Virginia	6 months
		<input checked="" type="radio"/> YES <input type="radio"/> NO	Newcastle Co. Civil Defense	1 month

EXPERIENCE WITH RADIATION (Actual use of Radioisotopes or equivalent)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
<sup>131</sup> I	50 mCi	University of Virginia	6 months	Diagnostic Therapy
<sup>32</sup> P	10 mCi	Duke University, University of Del. Hospital for Joint Diseases, NYC	6 years 3 years	Tracer Expts. Tracer Expts.
<sup>14</sup> C	10 mCi	Duke University, University of Del. Hospital for Joint Diseases, NYC	18 years	Tracer Expts.
<sup>3</sup> H	50 mCi			

BE TYPED

STATEMENT OF TRAINING AND EXPERIENCE

MUST BE TYPED

NAME James W. Nemitz, Ph.D.

DATE 12-16-86

TYPE OF TRAINING	ON THE JOB (circle)	FORMAL COURSE (circle)	WHERE TRAINED	DURATION OF TRAINING
Principles & practices of radiation protection	YES NO	/	Yale University School of Medicine	1 month
	/	YES NO	Yale University School of Medicine	1 day
Radioactivity measurement standardization & monitoring techniques & instruments	YES NO	/	Yale Univ. Sch. Med.	1 month
	/	YES NO	Yale Univ. Sch. Med.	1 day
Mathematics & calculations basic to the use & measurement of radioactivity	YES NO	/	Yale Univ. Sch. Med.	1 month
	/	YES NO	Yale Univ. Sch. Med.	1 day
Biological effects of radiation	YES NO	/	Yale Univ. Sch. MED.	1 month
	/	YES NO	Yale UNiv. Sch. Med.	1 day

EXPERIENCE WITH RADIATION (Actual use of Radioisotopes or equivalent)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
C <sup>14</sup>	1mCu	Yale University Sch. Med.	3 Years	Autoradiograph
C <sup>14</sup>	250 uCi	Medical College of Virginia	1 Year	Autoradiography

BE TYPED

STATEMENT OF TRAINING AND EXPERIENCE

MUST BE TYPED

NAME John A. Schriefer, Ph.D.

DATE 1-24-89

TYPE OF TRAINING	ON THE JOB (circle)	FORMAL COURSE (circle)	WHERE TRAINED	DURATION OF TRAINING
Principles & practices of radiation protection	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Department of Pharmacology Purdue University West Lafayette, IN	4 weeks
		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Division of Environmental Health & Safety University of Minn. Medical Sch. Minneapolis, MN	2 weeks
Radioactivity measurement standardization & monitoring techniques & instruments	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Purdue University (see above)	4 weeks
		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	University of Minnesota (see above)	2 weeks
Mathematics & calculations basic to the use & measurement of radioactivity	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Purdue University (see above)	4 weeks
		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	University of Minnesota (see above)	2 weeks
Biological effects of radiation	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Purdue University (see above)	4 weeks
		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	University of Minnesota (see above)	2 weeks

EXPERIENCE WITH RADIATION (Actual use of Radioisotopes or equivalent)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
125 I	2 mCi	University of Minnesota	10 years	Radioimmunoassay
3 H	250 mCi	Purdue University & Univ of MN	2 years	Receptor binding
14 C	250 mCi	Purdue University	1 year	Drug distribution
35 S	1 mCi	University of Minnesota	1 year	& Metabolism in vivo peptide synthesis rate
32 P	250 mCi	Ponce School of Medicine	1 year	detom. determination Protein Phosphorylation

BE TYPED

STATEMENT OF TRAINING AND EXPERIENCE

MUST BE TYPED

NAME DAVID E. BROWN, PhD

DATE 1/24/89

TYPE OF TRAINING	ON THE JOB (circle)	FORMAL COURSE (circle)	WHERE TRAINED	DURATION OF TRAINING
Principles & practices of radiation protection	<input checked="" type="radio"/> YES <input type="radio"/> NO	/	U. of Guelph, Ontario, Canada	2 years
	/	<input checked="" type="radio"/> YES <input type="radio"/> NO	U. of Guelph, Ontario	1 Semester
Radioactivity measurement standardization & monitoring techniques & instruments	<input checked="" type="radio"/> YES <input type="radio"/> NO	/	U. of Guelph	1 month
	/	<input checked="" type="radio"/> YES <input type="radio"/> NO	U. of Guelph	1 semester
Mathematics & calculations basic to the use & measurement of radioactivity	<input checked="" type="radio"/> YES <input type="radio"/> NO	/	U. of Guelph	1 month
	/	<input checked="" type="radio"/> YES <input type="radio"/> NO	U. of Guelph	1 semester
Biological effects of radiation	YES <input type="radio"/> NO <input type="radio"/>	/		
	/	<input checked="" type="radio"/> YES <input type="radio"/> NO	U. of Guelph	1 semester

EXPERIENCE WITH RADIATION (Actual use of Radioisotopes or equivalent)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
$^{51}\text{Cr}$	50 $\mu\text{Ci}$	U. of Guelph, Ontario	3 months	RBC tagging R.I.A.
$^{125}\text{I}$	"	"	1 year	
$^{141}\text{Ce}$	100 $\mu\text{Ci}$	U. of Illinois, Champaign-Urbana	3 months	} Radioactive Microspheres
$^{51}\text{Cr}$	"	"	3 months	
$^{86}\text{Rb}$	2 $\mu\text{Ci}$	U. of Illinois	6 months	live animal tissue uptake

MATERIALS LICENSE  
SUPPLEMENTARY SHEET

License number	47-19315-01
Docket or Reference number	030-17422
Amendment No. 02	

West Virginia School of Osteopathic Medicine  
400 North Lee Street  
Lewisburg, West Virginia 24901

In accordance with letter dated January 24, 1989, License Number 47-19315-01 is amended as follows:

To Add:

- |   |                                  |  |
|---|----------------------------------|--|
| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
| H. Cerium 141   | H. Any                           | H. 1 millicurie  |
| I. Iodine 129   | I. Calibration standard          | I. Less than 0.1 microcurie  |

9. Authorized use

- H. For use in research as described in attachment to letter dated January 24, 1989.
- I. For use in calibrating a gamma counter.

CONDITIONS

Conditions 12., 13., and 15. are amended to read:

- 12. Licensed material shall be used by, or under the supervision of, John Chambers, Larry Davis, Ann Hooper, John N. Mugaas, Judith O. C. Westrick, T. J. Mashburn, Arnold H. Hassen, Joan L. Moore, John A. Schriefer, James W. Nemitz, Louise T. Mashburn, or David E. Brown.
- 13. The Radiation Protection Officer for the activities authorized by this license is Louise T. Mashburn, Ph.D.
- 15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

~~030-17422~~  
200

ML 20

CP 4/9/89

**MATERIALS LICENSE  
SUPPLEMENTARY SHEET**

License number

47-19315-01

Docket or Reference number

030-17422

Amendment No. 02

(cont'd)

CONDITIONS

- A. Applications dated February 29, 1980 and June 6, 1985.
- B. Letters dated April 28, 1980, and January 24, 1989.



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

CAROL A. CONNELL

By

Region II, Nuclear Materials  
Safety Section  
101 Marietta Street, Suite 2900  
Atlanta, GA 30323

Date FEB 15 1989



(FOR LFMS USE)  
INFORMATION FROM LTS

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM  
AND  
REGIONAL LICENSING SECTIONS

PROGRAM CODE: 03620  
STATUS CODE: 0  
FEE CATEGORY: EX 3M  
EXP. DATE: 19900831  
FEE COMMENTS:

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: WEST VIRGINIA SCHOOL OF  
RECEIVED DATE: 890130  
DOCKET NO: 3017422  
CONTROL NO.: 252656  
LICENSE NO.: 47-19315-01  
ACTION TYPE: AMENDMENT

2. FEE ATTACHED

AMOUNT: -----  
CHECK NO.: -----

3. COMMENTS

SIGNED       *Dean C. Heron*        
DATE       1/24/89      

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE #03 IS ENTERED /    /   )

**FEE EXEMPT**

1. FEE CATEGORY AND AMOUNT: -----

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:  
AMENDMENT               
RENEWAL       -----        
LICENSE       -----      

170.1165

3. OTHER -----  
-----

SIGNED       *As [Signature]*        
DATE       2/6/89      

12  
11  
10  
9  
8  
7  
6  
5  
4  
3