University of Colorado **Denver | Anschutz Medical Campus**

ENVIRONMENTAL HEALTH & SAFETY | RADIATION SAFETY

and

COMMITTEE ON IONIZING RADIATION

OFFICE OF THE ASSISTANT VICE CHANCELLOR FOR REGULATORY COMPLIANCE

RAM Application – Non-Human Use

FOR EHS USE ONLY
CIR application no.

Submit completed form – *typed only, not handwritten* -- to radappnh@ucdenver.edu.
Incomplete applications will not be processed

I. PI Information *Refer to EHS Radiation Safety Manual, Sec. 2.4.2, 2.4.11, and 2.4.14*

PI: _____ Phone: _____

Faculty position: _____ Department: _____

Co-investigator: _____ Phone: _____

Faculty position: _____ Department: _____

II. Location of Use

Use on UCHealth property requires application to the University of Colorado Hospital Radiation Safety Committee.

Building: _____ Room no(s).: _____ Fume hood room no.: _____

BSC #: _____ Certification date: _____ Serial no. _____

III. Radiation Workers *Refer to EHS Radiation Safety Manual, Sec. 2.4.8, 2.4.10, and 2.4.13.*

Name: _____ Name: _____

Name: _____ Name: _____

Name: _____ Name: _____

Name: _____ Name: _____

IV. Radioactive Material and Amounts

Isotope: _____ Half-life: _____ Maximum radiation energy (MeV): _____

Type of decay: _____ Compounds: _____

Radioactivity to be used per experiment: _____ mCi Possession limit (~2 x monthly use): _____ mCi

Estimated no. of experiments per month: _____ Yearly limit (~12 x monthly use): _____ mCi

Radioactivity used per month: _____ mCi

V. PI Training and Experience

A. Presently authorized as PI with other radioisotopes: ◯ Yes ◯ No

If **yes**, complete below:

Authorization no.:_____ Isotope:_____ Possession limit: _____ mCi Yearly limit: _____ mCi

Authorization no.: _____ Isotope:_____ Possession limit: _____ mCi Yearly limit: _____ mCi

Authorization no.: _____ Isotope:_____ Possession limit: _____ mCi Yearly limit: _____ mCi

If **no**, complete EHS RAM PI Training and enter date of certification: _____

B. RAM basic handling techniques training:

The CIR may not review application if experience/training information is omitted.

Field of Training	**Location and Dates of Training** *example: CU Anschutz, Aurora, CO Rad Safety Part II, 9-6-2016*	**Lecture or Lab Courses (hours)**	**Supervised Lab Experience (hours)**
Radiation physics and instrumentation			
Radiation protection			
Mathematics pertaining to use and measurement of radioactivity			
Radiation biology			
Radiopharmaceutical or chemistry			

C. Radiation and RAM experience:

Radionuclide(s) *example: I-125, P-32*	**Maximum Amt. (mCi)** (respectively, relevant to column 1) *example: 0.5, 1.0*	**Where Experience Acquired** *example: U of Washington*	**Duration** *example: 2002 – 2006*	**Type of Use** *example: Labeling cells, DNA for biochemical and molecular analysis*

VI. Plan of Investigation

A. For use in animal? ◯ Y ◯ N

If **yes**:

1. List animal protocol number(s): _____

2. Describe plans for housing, marking cages, and controlling waste:

_____

B. For in-vitro use? ◯ Y ◯ N

C. For use in:

	Yes	No
Infectious organisms	◯	◯
Cell culture	◯	◯
Animal specimen	◯	◯
Human specimen	◯	◯
rDNA or rRNA	◯	◯

If **yes** to any above, list biosafety authorization number(s): _____

If **yes** to any above, list origins of cells or samples, including cell line number (i.e., human, primary, animal, continuous).

D. Will the compound ever be in volatile or unbound form?: ◯ Y ◯ N

If **yes**, describe the precautions taken to control release and reduce exposure from releases:

E. Description of experiment

Be explicit and detailed. Include a list of all physical and chemical handling steps involved. Identify reagents involved in potentially radioactive products or mixtures. EHS recommends attaching a flow chart of the experiment to identify these steps, the wastes that are generated, and disinfection efforts (if applicable).

Example:
32P DNA Oligonucleotide End-Labeling:
In hood, remove 32P-labelled nucleotide (ATP) from freezer box and allow to thaw in hood, behind shield. Heat heating block to 37 degrees C behind shield, and combine the following:
2.0 ul DNA
2.5 ul 10X PNK Buffer
5.75 ul H20
12.5 ul 32P-ATP (125 uCi; 3000 Ci/mmol; 10 mCi/ml)
In 1.5 ml Eppendorf tube, combine the following for polynucleotide kinase reactions:
Add gel sample buffer (95%) formamide, 500 mM EDTA, 5 mg/ml bromophenol ble, 0.05% xylene cyanol FF) to sample.
Load Sample into 1-2 wells of a denaturing polyacrylamide/urea gel and electrophorese at 1500 V for 2 hours. Remove gel plates from apparatus. Cut off excess acrylamide lanes and blot gel of excess liquid.
Etc.

E. Description of experiment (continued; see example on previous page)

VII. Exposure Control and Monitoring

A. Does this lab currently receive dosimetry service from EHS? ◯ Y ◯ N

Note: The use of dosimeters is not required for pure beta emitters with maximum energies <0.5 MeV, e.g., H-3, C-14, S-35).

Comments: _____

B. Describe the methods and precautions that will be used to protect radiation works from internal/external radiation exposure. *Refer to EHS Radiation Safety Manual, Sec. 3.4.3, 3.4.4, and 3.4.5, pages 42-60.*

Example:

1. *Workers will maintain their exposure as low as practical.*
2. *Dosimeters, if applicable, will be worn on the appropriate part of the body when working with RAM.*
3. *No food or drink is allowed in the laboratory.*
4. *Hands, shoes, coat and skin will be surveyed before leaving the laboratory.*
5. *When working with radioactive materials, workers will wear appropriate eye protection, lab coats, closed-toed shoes and long pants.*
   Etc.

C. Describe the precautions that will be taken to ensure security of all RAM, including waste and stock material.

Example:

1. *Refrigerators and freezers storing RAM will be locked.*
2. *Waste containers will be stored in a locked cabinet.*
3. *The door to the laboratory will be closed and locked whenever there is no one in the lab.*
4. *Lab personnel will notice and challenge everyone who enters who is not associated with the lab.*
   Etc.

VIII. Radiation Monitoring

Refer to EHS Radiation Safety Manual, Sec. 2.4.13 and 3.4.3.

A. Portable survey instrument(s)

*Each PI must **own** a portable survey instrument, except those using **only** H-3.*

Make: _____ Model: _____ Serial no.: _____

Calibration due: _____ Probe model: _____ Probe serial no.: _____

Make: _____ Model: _____ Serial no.: _____

Calibration due: _____ Probe model: _____ Probe serial no.: _____

B. Liquid scintillation counter

Make: _____ Model: _____ Serial no.: _____

Calibration due: _____ Location: _____

C. Gamma counter

Make: _____ Model: _____ Serial no.: _____

Calibration due: _____ Location: _____

D. Frequency of contamination surveys (swipes tests, portable instrument sweeps)

Documented surveys must be performed in accordance with the Laboratory Hazard Classification requirements. Refer to EHS Radiation Safety Manual, Appendix XV.

◯ Daily ◯ Weekly ◯ Monthly

Location where survey records will be stored: _____

IX. Radioactive Waste Handling and Disposal

A. Describe the waste handling steps of the experiment.

Be explicit and detailed. EHS recommends attaching a flow chart showing the waste-handling steps.

Example:
All Eppendorf tips and tubes are deposited into a plastic container used exclusively for 32P waste, kept behind an acrylic shield. This container is periodically emptied into the bulk dry radioactive waste. Used buffer and gel soaking solutions are collected in the liquid radioactive waste. The wrapped, discarded gel, elution membranes and Spin-X cartridges, and elution tips are disposed as solid waste. Organic solutions, such as ethanol, are collected as mixed waste. Vials containing organic solutions will be collect in vial trays and labeled as “Mixed Waste.”

B. Will chemical/radioactive mixed wastes be produced?

Refer to EHS Radioactive Waste Disposal Manual, Sec. II G and IV C, E and K for classification of mixed wastes.

◯ Y ◯ N

B. Will chemical/radioactive mixed wastes be produced?

If **yes**, provide justification for the production of these wastes here, and complete the "Organic" row in Table D.

C. Will infectious radioactive wastes be produced, requiring disinfection and collect as biological non-carcass material?

Refer to EHS Radioactive Waste Disposal Manual, Sec. II G, and IV G and I for classification of biological non-carcass waste.

◯ Y ◯ N

If **yes**, describe the method for disinfection here, and complete "Biological (non-carcass)" in Table D.

D. Anticipated waste forms, volumes, and percentages of total radioactivity

Refer to EHS Radioactive Waste Disposal Manual, Sec. II G, and IV G and I for classification of biological non-carcass waste.

Waste Type	**Volume Generated Monthly**	**Percent of Total Radioactivity**	**Disinfection Required** (as indicated in IX. C., above)	
			Yes	**No**
Dry solids	cubic feet		◯	◯
Aqueous	gallons		◯	◯
Scintillation vials	(# of trays)		◯	◯
Cocktail manufacturer: Product name:				
Biological non-carcass	cubic feet		◯	◯
Biological carcass	animal quantity		◯	◯
Organic (see item IX, section B, above)	gallons		◯	◯
Other			◯	◯

By my signature, below, I agree that all radioactive materials procured as a result of this application will be used only as specified above, and in accordance with the guidelines of the EHS Radiation Safety Manual, as well as all other applicable university policies and procedures, the University Radioactive Materials License, and state and federal regulations.

PI signature: _____ Date: _____

Co-Investigator signature: _____ Date: _____