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

ENVIRONMENTAL HEALTH AND SAFETY | RADIATION SAFETY

Radioactive Materials Application – Non-Human Use

Committee on Ionizing Radiation
Office of the Assistant Vice Chancellor for Regulatory Compliance

CIR Application Number (For EHS Use Only)

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

Principal Investigator	Faculty Position
Department	PI Phone

Co-Investigator	Faculty Position
Department	Co-Investigator Phone

II. Location of Use
(Use on University Hospital Property requires application to the University Hospital Radiation Safety Committee)

Building		Room Number(s)		Fume Hood Rm #	
Biosafety Cabinet Rm # (If Applicable)		Make/Model:		S/N:	

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

1.	2.
3.	4.
5.	6.
7.	8.

IV. Radioactive Material and Amounts

Isotope		Half-life of Isotope		Maximum Radiation Energy (MeV)	
Type of Decay (Alpha, Beta, Gamma)		Compounds			

A. Radioactivity to be used per experiment	mCi
B. Estimated # of experiments/month	
C. Radioactivity used/month	mCi

Possession Limit (~2x C)	**mCi**	**Yearly Limit (~12x C)**	**mCi**

V. Principal Investigator Training and Experience

A. Are you presently authorized as a PI with other radioisotopes?			YES ☐		NO ☐		
If YES, list your authorization numbers below							
Authorization #		Isotope:		Possession Limit	mCi	Yearly Limit	mCi
Authorization #		Isotope:		Possession Limit	mCi	Yearly Limit	mCi
Authorization #		Isotope:		Possession Limit	mCi	Yearly Limit	mCi
If NO, you must pass the university certification tests given by EHS for the PI Level.							
Date of certification:							

B. Training Received in Basic Handling Techniques for Radioactive Material
(Note: The CIR may not review this application if experience/training information is omitted. Below is NRC Form 313M Supplement A equivalent)

Field of Training	Location and Dates of Training *For Example…* *CU Anschutz Medical Campus, Aurora, CO (Mod 1) 07-01-2010*	Lecture or Laboratory Courses (Hours) *1 Hour*	Supervised Laboratory Experience (Hours) *5 Hours*
1. Radiation Physics and Instrumentation			
2. Radiation Protection			
3. Mathematics Pertaining to the Use and Measurement of Radioactivity			
4. Radiation Biology			
5. Radiopharmaceutical or Chemistry			

C. Experience with Radiation and Radioactive Materials

Radionuclide(s) *For Example…* *I-125, P-32*	Maximum Amount (mCi), respectively *0.5, 1.0*	Where Experience Gained *Univ. of Washington*	Duration *1980 – 1988*	Type of Use *Labeling cells, DNA for biochemical and molecular analysis*

VI. Plan of Investigation

A. For use in animals?	YES ☐	NO ☐
If YES, list animal protocol number(s)		

If YES, describe plans for housing, marking cages, and controlling waste

B. For In-Vitro Use?	YES ☐	NO ☐
C. For use in		
Infectious Organisms	YES ☐	NO ☐
Cell Culture	YES ☐	NO ☐
Animal Specimen	YES ☐	NO ☐
Human Specimen	YES ☐	NO ☐
rDNA or rRNA	YES ☐	NO ☐
If YES to any of the above, list Biosafety Authorization number(s)		
If YES to any of the above, list the 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?	YES ☐	NO ☐
If YES, describe the precautions taken to control release and reduce exposure from these releases		

E. Description of Experiment
(Be explicit and detailed; include a list of all physical and chemical handling steps in which the radioactive material is involved; identify reagents involved in potentially radioactive products or mixtures; EHS recommends attaching a flow chart of your experiment to identify these steps, wastes generated, and disinfection (if applicable).

For Example:
32P DNA Oligonucleotide End-Labeling:
In hood remove 32P-labeled nucleotide (ATP) from freezer box and let thaw in hood, behind shield. Heat heating block to 37 degrees C behind shield, 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 reaction
Add gel sample buffer (95% formamide, 500 mM EDTA, 5 mg/ml bromophenol blue, 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 of excess acrylamide lanes and blot gel of excess liquid.
ETC…

VII. Exposure Control and Monitoring

A. Do you subscribe to the EHS dosimetry badge service? (Note: badges are not required for pure beta emitters with maximum energies less than 0.5 MeV – e.g. H-3, C-14, S-35)	YES ☐	NO ☐
Comments		

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

For Example:

1. *Workers will maintain their exposure as low as practical.*
2. *Dosimetry badges, if applicable, will be worn on the appropriate location when working with radioactive materials.*
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 goggles, lab coats, eye protection, closed toed shoes and long pants.*

ETC…

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

For Example:

1. *Refrigerators and freezers storing radioactive materials will be locked.*
2. *Waste containers will be stored in a locked cabinet.*
3. *The door to the laboratory will be closed and locked when no one is in the laboratory.*
4. *Laboratory personnel will notice and challenge everyone who enters the laboratory who is not associated with the laboratory.*

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 H-3 ONLY)

Make		Model		S/N	
Calibration Due Date:		Probe Model		Probe S/N	
Make		Model		S/N	
Calibration Due Date:		Probe Model		Probe S/N	

B. Liquid Scintillation Counter

Location		Make		Model		S/N	
Calibration Due Date:							

C. Gamma Counter

Location		Make		Model		S/N	
Calibration Due Date:							

D. Frequency of Contamination Surveys (swipe tests, portable instrument sweeps)
(Note: 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 to include the waste handling steps)

For Example: All Eppendorf tips and tubes are deposited into a plastic container used exclusively for 32P waste kept behind a Plexiglas™ 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 collected in vial trays and labeled as "Mixed Waste".

B. Will you produce any chemical-radioactive mixed wastes? (Refer to EHS Radioactive Waste Disposal Manual, Sec. II G and IV C, E and K for classification of mixed wastes)	YES ☐	NO ☐
If YES, please justify the production of these wastes here and complete the "Organic" row in the table "D." below.		

C. Will you produce any infectious radioactive wastes that require disinfection and collection 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)	YES ☐	NO ☐
If YES, please describe the method for disinfection here and complete the "Biological (non-carcass)" row in the table "D." below.		

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 per Month**	**% of Total Radioactivity**	**Requires Disinfecting** (as indicated in Item IX Section C above)
Dry Solids	(cubic feet)		YES ☐ NO ☐
Aqueous	(gallons)		YES ☐ NO ☐
Scintillation vials Cocktail mfr/product name	(# of trays)		YES ☐ NO ☐
Biological (non-carcass)	(cubic feet)		YES ☐ NO ☐
Biological (carcass)	(type and number of animals)		YES ☐ NO ☐
Organic (please justify in Item IX Section B above)	(gallons)		YES ☐ NO ☐
Other			YES ☐ NO ☐

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 University Radiation Safety Manual, as well as all other applicable university policies and procedures, the University Radioactive Materials License, and state and federal regulations.

Signature of PI	Date
Signature of Co-Investigator	Date