

MERIDIAN INSTITUTE FOR BIOMEDICAL RESEARCH

Office of Radiation Safety | 4100 Cortland Parkway, Ashford Heights | radsafety@meridianibr.org

RADIATION SAFETY WORK PERMIT



IONIZING RADIATION AREA

Authorized personnel only. Entry requires a current dosimetry badge and completion of Radiation Worker Training (RWT-100). Report all spills, contamination events, and lost badges to the Radiation Safety Office immediately.

Permit Identification

STATUS: ACTIVE

Permit Number:	MIBR-RSO-2026-0147	Facility:	Life Sciences Building
Permit Type:	Renewal (Annual)	Room(s):	214, 214A (hot lab), 216 (storage)
Issue Date:	📅 Jan 15, 2026	RUC File:	RUC-2021-0038
Expiration Date:	📅 Jan 14, 2027	License Reference:	Broad Scope Byproduct Material License No. 44-BM-1187
Last Annual Review:	📅 Jul 10, 2026	Amendment No.:	6

Principal Investigator and Work Description

Principal Investigator: Dr. Elena Marquez, Department of Cell Biology
Phone / Email: 📞 (555) 214-0433 e.marquez@meridianibr.org
Laboratory: Molecular Oncology Laboratory (Marquez Lab)

Description of authorized work. This permit authorizes the receipt, storage, and use of unsealed byproduct material for nucleic acid and protein labeling procedures, including ³²P and ³⁵S incorporation into cDNA and riboprobes for Northern and Southern hybridization, ¹²⁵I radioimmunoassay and receptor-binding studies, and ³H metabolic labeling of membrane lipids. A sealed ¹³⁷Cs check source is authorized for daily constancy checks of the laboratory’s liquid scintillation counter and survey instruments. Work is confined to the fume hood and bench areas designated in Room 214A and posted as a Radioactive Materials Area under §20.1902 of the applicable federal radiation protection standard [1].

Authorized Users

Name	Role	Badge ID	RWT Completion
Dr. Elena Marquez	Principal Investigator	RSO-4471	2026-01-06
Dr. Raj Patel	Postdoctoral Fellow	RSO-4472	2026-01-06
Ana Kowalski	Graduate Student	RSO-4473	2026-02-11
Wen Zhao	Research Technician	RSO-4474	2026-02-11

Radionuclide and Activity Authorization

FORM MIBR-RS-3

Possession and use are limited to the radionuclides, chemical/physical forms, and activities listed below. Any request to exceed the permitted activity, add a new radionuclide, or change chemical form requires a written amendment approved by the Radiation Safety Officer (RSO) before work begins.

Radionuclide	Form	Requested	Permitted	Half-Life	Principal Use
^{32}P	Aqueous, unsealed	5 mCi	5 mCi	14.29 d	cDNA/riboprobe labeling, Southern and Northern blot
^{35}S	Aqueous, unsealed	2 mCi	2 mCi	87.5 d	Metabolic protein labeling, autoradiography
^{125}I	Aqueous, unsealed	1 mCi	1 mCi	59.4 d	Radioimmunoassay, receptor-binding assays
^3H	Aqueous, unsealed	3 mCi	3 mCi	12.32 y	Lipid metabolic labeling
^{137}Cs	Sealed check source	10 μCi	10 μCi	30.17 y	Instrument constancy and calibration checks

Total possession limit: the sum of activity on hand for all unsealed radionuclides listed above shall not exceed 11 mCi at any time, consistent with the possession limit assigned under Amendment No. 6 of License No. 44-BM-1187. Stock vials shall be logged into the isotope receipt/use/disposal ledger (Form MIBR-RS-7) within one working day of receipt.

Reorder / decay note. ^{32}P stock older than 60 days and ^{125}I stock older than 120 days shall be surveyed for activity, relabeled with the current assay date, or transferred to decay-in-storage waste per Section 4.

Shielding Requirements

FORM MIBR-RS-3

Radionuclide	Shielding	Min. Thickness	Notes
^{32}P	Acrylic (low-Z)	1 cm bench shield, 6 mm vial shield	High-energy beta emitter; do not shield directly with lead – bremsstrahlung X-rays result. Back an acrylic shield with lead only for bulk stock storage.
^{35}S	None required	–	Weak beta (E_{max} 0.167 MeV) is stopped by lab-coat sleeve and glove; standard bench liner is sufficient.
^{125}I	Lead	3 mm (0.25 in)	Electron-capture decay emits 27–35 keV X-rays; lead pig required for stock, lead-glass shield at bench.
^3H	None required	–	Pure low-energy beta (E_{max} 0.0186 MeV); no external hazard, ingestion/absorption controls apply.
^{137}Cs	Lead-lined pig	Manufacturer-rated (source ≤ 10 μCi)	Store in the locked source safe in Room 216 when not performing a check; log removal/return in Form MIBR-RS-9.

Monitoring Requirements

FORM MIBR-RS-4

Instrumentation. A calibrated GM pancake survey meter (beta/gamma) shall be present at each use bench. ^{125}I work additionally requires a NaI thyroid probe available for bioassay. Survey meters are calibrated annually against the ^{137}Cs check source and verified daily with a source-check reading logged in Form MIBR-RS-9, consistent with performance criteria in [2].

Area surveys. Meter surveys of bench surfaces, floor, and hood sash are required at the end of every use session. Results below $2\times$ background require no action; results at or above $2\times$ background trigger decontamination and a wipe test before the area is released.

Wipe testing. Weekly wipe tests (100 cm^2 template) are required for all active use and storage locations while unsealed material is on hand. Removable contamination at or above $200\text{ dpm}/100\text{ cm}^2$ requires decontamination, re-wipe, and an entry in the contamination log.

Postings. Room 214A is posted “Caution – Radioactive Materials” with the trefoil symbol at each entrance. Storage containers and waste receptacles are individually labeled with radionuclide, activity, and assay date.

Control	Frequency	Responsible	Record
Survey meter source check	Daily (use days)	Authorized user	MIBR-RS-9
Bench and hood wipe test	Weekly	Authorized user	MIBR-RS-9
Survey meter calibration	Annual	RSO / vendor	MIBR-RS-11
Sealed source leak test	Semiannual	RSO	MIBR-RS-12

Personal Protective Equipment

FORM MIBR-RS-5

Required for all unsealed-material work:

- ☐ Disposable lab coat, buttoned
- ☐ Double nitrile gloves, taped at the cuff
- ☐ Safety glasses or goggles
- ☐ Whole-body TLD badge, worn on the collar

Additional for ^{125}I and ^{32}P :

- ☐ Ring dosimeter, worn under the inner glove
- ☐ Lead-glass bench shield in place
- ☐ Absorbent bench-top liner

Standard Operating Procedure

FORM MIBR-RS-6

1. Confirm the permit is active and the planned activity is within the authorized limit for the radionuclide in use.
2. Don required PPE listed above; verify the survey meter passes its daily source check.
3. Perform a background survey of the bench and shield before opening stock.
4. Work over an absorbent liner, within the designated shielded area, using tongs or a remote pipetting aid for stock transfers exceeding 1 mCi .
5. Keep containers capped except during active transfer; return stock to the lead pig or acrylic caddy immediately after use.
6. Survey gloved hands, tools, and the work surface with the pancake probe at the end of the procedure; decontaminate any reading above $2\times$ background before continuing.
7. Remove outer gloves and lab coat, survey bare hands and clothing at the doorway monitor, and record the activity used, start/end time, and survey results in the isotope use log (Form MIBR-RS-7).
8. Route liquid and solid waste to the correctly labeled decay-in-storage container; never combine radionuclides with different half-lives in the same container.

⚠ Prohibited practices: mouth pipetting, eating or drinking in Room 214/214A, applying cosmetics at the bench, and removing unsealed material from the posted area without RSO authorization and a documented transfer survey.

Dosimetry Record

FORM MIBR-RS-8

Whole-body and, where applicable, extremity dosimeters are issued to every authorized user and exchanged monthly through the contracted dosimetry service. Readings below are the most recent monthly exchange and the running total for the current calendar year; the occupational annual limit is 5,000 mrem (50 mSv) whole body, per [3].

Name	Badge Type	Exchange	Latest (mrem)	YTD (mrem)
Dr. Elena Marquez	Whole-body TLD	Monthly	4	22
Dr. Raj Patel	Whole-body TLD + ring	Monthly	8	41
Ana Kowalski	Whole-body TLD + ring	Monthly	3	15
Wen Zhao	Whole-body TLD + ring	Monthly	6	29

Administrative control level. A written investigation is triggered whenever any individual's cumulative annual reading reaches 500 mrem (10% of the annual occupational limit). No user on this permit has exceeded the control level in the current dosimetry cycle.

Bioassay. Thyroid bioassay by NaI probe is required within 72 hours of any single handling event involving more than 1 mCi of volatile ^{125}I , and quarterly for routine users of the isotope regardless of single-handling activity. Results are recorded on Form MIBR-RS-10 and retained for the duration of employment plus 30 years, consistent with operational program recommendations in [4].

User	Last Bioassay	Result	Next Due
Dr. Raj Patel	2026-06-02	Below detectable limit	2026-09-02
Ana Kowalski	2026-05-19	Below detectable limit	2026-08-19

Emergency Contacts

FORM MIBR-RS-13

Role	Name	Phone
Radiation Safety Officer	Dr. Marcus Feld	☎ (555) 214-0900
Alternate RSO	Priya Subramaniam	☎ (555) 214-0901
Campus Security (24 hr)	Ashford Heights Dispatch	☎ (555) 214-0911
Environmental Health & Safety	EHS Duty Officer	☎ (555) 214-0700

Spill Response

FORM MIBR-RS-14

Minor spill (contained, activity below 1 mCi, no personnel contamination):

1. Alert everyone in the room; restrict entry.
2. Cover the spill with absorbent pads; do not spread material.
3. Survey the perimeter to confirm the spill is contained.
4. Don gloves and clean from the outside inward into a labeled waste bag.
5. Re-survey; notify the RSO and log the event on Form MIBR-RS-14.

Major spill (activity above 1 mCi, personnel contamination, or airborne risk):

1. Evacuate the room immediately; close the door.
2. Post a person outside to prevent entry; do not attempt cleanup.
3. Call the RSO and Campus Security from the table above.
4. Contaminated individuals remove affected clothing and proceed to the nearest safety shower or sink for skin decontamination.
5. Await RSO clearance before re-entry.



Spill kits are located immediately outside Room 214A and inside the fume hood cabinet in Room 216. Each kit contains absorbent pads, a survey meter, disposable gloves, forceps, and hazard labels – check contents monthly and log on Form MIBR-RS-14A.

Conditions of Permit

FORM MIBR-RS-15

- ☐ All authorized users complete Radiation Worker Training annually and before any change in radionuclide or activity level.
- ☐ Postings and labels comply with the facility's Radioactive Materials Area signage standard and are inspected at each quarterly RSO audit.
- ☐ Dosimetry badges are worn whenever unsealed material is handled and are never shared between individuals.
- ☐ This permit is void if the possession limit, radionuclide list, or authorized location changes without a written amendment signed by the RSO.
- ☐ The RSO or designee may suspend work under this permit at any time for cause, including a missed wipe test, an unresolved contamination event, or an expired instrument calibration.
- ☐ Waste is segregated by radionuclide and disposed of only through the Radiation Safety Office decay-in-storage program; no radioactive material is placed in regular trash or sink drains without documented RSO release.

Regulatory References

- Standards for Protection Against Radiation, 10 CFR Part 20 [1]
- ICRP Publication 103, Recommendations of the International Commission on Radiological Protection [3]
- ANSI/HPS N13.11, Personnel Dosimetry Performance Criteria [2]
- NCRP Report No. 127, Operational Radiation Safety Program [4]

Approvals

FORM MIBR-RS-1

Principal Investigator	_____	Date: _____
	Dr. Elena Marquez	
Radiation Safety Officer	_____	Date: _____
	Dr. Marcus Feld	
Radiation Safety Committee Chair	_____	Date: _____
	Dr. Ingrid Solberg	
Director, Environmental Health & Safety	_____	Date: _____
	Thomas Whitfield	

This permit is valid only when signed by all four parties above and remains subject to periodic audit by the Radiation Safety Office.

References

- [1] Standards for protection against radiation, 10 CFR part 20. Technical report, U.S. Nuclear Regulatory Commission, Washington, DC, 2023.
- [2] American National Standards Institute and Health Physics Society. American national standard for personnel dosimetry performance – criteria for testing, ANSI/HPS N13.11. Technical report, ANSI/HPS, 2009.
- [3] International Commission on Radiological Protection. The 2007 recommendations of the international commission on radiological protection, ICRP publication 103. Technical report, ICRP, 2007.
- [4] National Council on Radiation Protection and Measurements. Operational radiation safety program, NCRP report no. 127. Technical report, NCRP, Bethesda, MD, 1998.