Environmental Health and Safety
Title: WORKING WITH NANOPARTICLES SOP
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I. Purpose

This SOP establishes standard safety procedures for researchers handling nanoparticles at UNT Health Campus.

II. Scope

This standard operating procedure applies to all research work with nanoparticles at UNT Health campus.

III. Summary of Nanoparticle Hazards and protocol requirements

- Engineered nanoparticles have at least one dimension between 1–100 nm.
- May have novel properties and unknown toxicities.
- Can enter the body via inhalation, ingestion, skin absorption, or injection.
- Nanoparticles often agglomerate but may still pose respiratory or dermal hazards.
- Toxicity data is still evolving — handle all as potentially hazardous.
- Research involving invitro studies of nanoparticles should be reviewed and approved by the Institutional Biosafety Committee (IBC).
- Research involving animal studies should be reviewed and approved by IACUC and IBC.

IV. Routes of Occupational Exposure

a. Inhalation

- Can penetrate deep into lungs and translocate to other organs.
- Avoid aerosol generation; use ventilated containment.

b. Ingestion

- May be absorbed via digestive tract.
- No eating, drinking, or applying cosmetics in lab areas.

c. Skin Absorption

- Nanoparticles may permeate skin and enter circulation.
- Always wear double nitrile gloves.
- Remove outer gloves in a fume hood and seal in waste bags.

d. Injection

- Avoid exposure from needle sticks or animal handling.
- Use sharps carefully and follow biomedical safety procedures.

V. Laboratory Safety Practices

1. Wear double nitrile gloves, lab coat, safety glasses/goggles, Closed toe shoes and long pants/ skirts.
2. Train all lab members on nanoparticle hazard. Contact EHS at Safety@unthsc.edu for nano safety overview and training.
3. Prohibit eating, drinking, and personal care activities in work areas.
4. Obtain and review SDS for each material used in the preparation and handling of nanoparticles; interpret cautiously.
5. Handle nanoparticles in solution or on substrates whenever possible.
6. If dry handling is necessary, use in one of the following containment equipment:
    - HEPA-filtered local capture hoods
    - BSC
    - Glove boxes
    - Laboratory fume hoods
7. If you are not working in a biosafety cabinet, fume hood or glove compartment, use respirator when airborne exposure risk exists. Contact EHS for respirator fitting and question with respirator.
8. Use ear protective device when working with sonicators. Contact EHS for Noice level monitoring.
9. Clean workspaces with appropriate disinfectants (while using biohazard materials) or wet wipes (with detergent or 10% bleach):
    - Daily cleaning of work surfaces is required
10. Use disposable bench paper or wipe down surfaces regularly.
11. Transportation- Please refer to UNT Health IBC SOP for transport of biohazard materials.

12. In the event of personnel exposure during business hours, immediately contact the PI and BSO, perform first aid care as needed and the personnel will visit the Priority Care Clinic, IREB First floor 3430 Camp Bowie Blvd. Fort Worth TX. 76107. If the exposure occurs after business hours or on a weekend, personnel will inform the PI and go to emergency clinic of their choice.
13. An incident form must be submitted to EHS.

VI. Spill Response Procedures

- Immediately report spill to PI and EHS.
- Wear full PPE including double gloves and respiratory protection if airborne exposure risk exists.
- Clean workspaces with appropriate disinfectants (while using biohazard materials) or wet wipes with detergent.
- Never dry sweep or brush nanoparticles powder.
- Call EH&S for assistance with airborne or uncertain spill events.

VII. Waste Disposal and storage

- Treat all nanoparticle waste as hazardous unless verified otherwise. Identify the hazards present with the nanoparticle and follow the SOP for mixed waste disposal process. Disinfect the biological hazards with detergent or appropriate disinfectants.
- If there is any radioisotope used in the preparation of these nanoparticles, do not mix with any other waste. Collect them and label with all the materials present. Contact EHS for pick up and disposal.
- Dispose of solutions according to solvent disposal guidelines and refer to UNT Health hazardous waste disposal SOP for more details.
- Clearly label containers and store securely.

VIII. References and Resources

- Approaches to safe Nanotechnology (CDC/NIOSH)
- Working safely with Nanomaterials (OSHA)
- NanotoolkitWorking_Safely_with_Engineered_Nanomaterials_in_Academic_Research_Settings.

IX. Versions Revisions

- Initially approved April 6, 2020
- Revised June 3, 2025
- Revised July 29, 2025, update to new branding and made accessible