

University of Southern California
Institutional Animal Care and Use Committee
Footpad Injection Policy

A. Background

Footpad injections in rodents have historically been used for various applications, including the study of local immunological response. However, there are drawbacks to using this injection route: rodents use their forefeet to handle food and groom themselves, and the hind feet are major weight-bearing structures. Inflammation and swelling at the footpad injection site can result in pain and lameness.

The NIH Animal Research Advisory Committee Guidelines state that “whenever possible, the least invasive methodology required to accomplish an experimental goal should be utilized, and more invasive injection routes should be avoided unless scientifically justified.”

Consistent with NIH guidelines , footpad injections are not permitted at USC unless scientific justification is provided and approved by the IACUC. Researchers must consider alternative injection sites/routes, such as subcutaneous hock injection, prior to performing footpad injections (Kamala, 2007).

If approved to perform footpad injections, researchers must follow the guidelines outlined in this document.

B. Definitions

Adjuvant: a drug or substance that is used to increase the efficacy or potency of another drug

Footpad injection: any intradermal or subcutaneous injection into the plantar surface of the foot of an animal; also called intraplantar injection

Plantar: relating to the sole of the hind foot

C. Applicability

This policy applies to all individuals that have been approved by the USC IACUC to perform footpad injections in mice and/or rats.

D. Policy

If the USC IACUC approves the use of footpad injections, the investigator must follow the NIH ARAC Guidelines below:

- The maximum injection volume is 50 μ L for adult mice and 100 μ L for adult rats.
 - If an adjuvant is used, it must be limited to the minimum effective volume.
- Only one foot per experimental animal may be used.
- The animal must be housed on soft bedding.
- This route may not be used for routine immunizations.

Further guidelines from the USC IACUC are as follows:

- Application of ethyl alcohol, isopropyl alcohol, or other appropriate topical disinfectant is recommended prior to injection
- After footpad injection, animals must be monitored daily (including weekends and holidays) for pain, distress, excess inflammation, infection, or complications until euthanasia.
 - Animals exhibiting any of these signs must be reported to DAR veterinary staff for evaluation as soon as possible.
- If multiple injections are required, the amount of time between injections must be clearly stated in the IACUC protocol.
- Objective humane endpoints must be clearly described in the IACUC protocol.

E. References

1. Kamala, T. (2007). "Hock immunization: a humane alternative to mouse footpad injections." *Journal of Immunological Methods*, 328(1-2), 204–214.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2464360/>
2. NIH Animal Research Advisory Committee (ARAC) (2022). "Guidelines for the Use of Adjuvants in Research." <https://oacu.oir.nih.gov/animal-research-advisory-committee-arac-guidelines>