The 3 Rs
of Animal Research

Promoting Animal Welfare and Guiding Scientists in the Ethical Conduct of Research

REPLACEMENT

Replacing conscious, living vertebrates with cell or tissue cultures, computer models, simulation models, and/or less-developed animal species.

Examples: Replacing rodents with zebrafish or fruit flies to study the effects of genetic mutation; learning a surgical technique using a simulator.
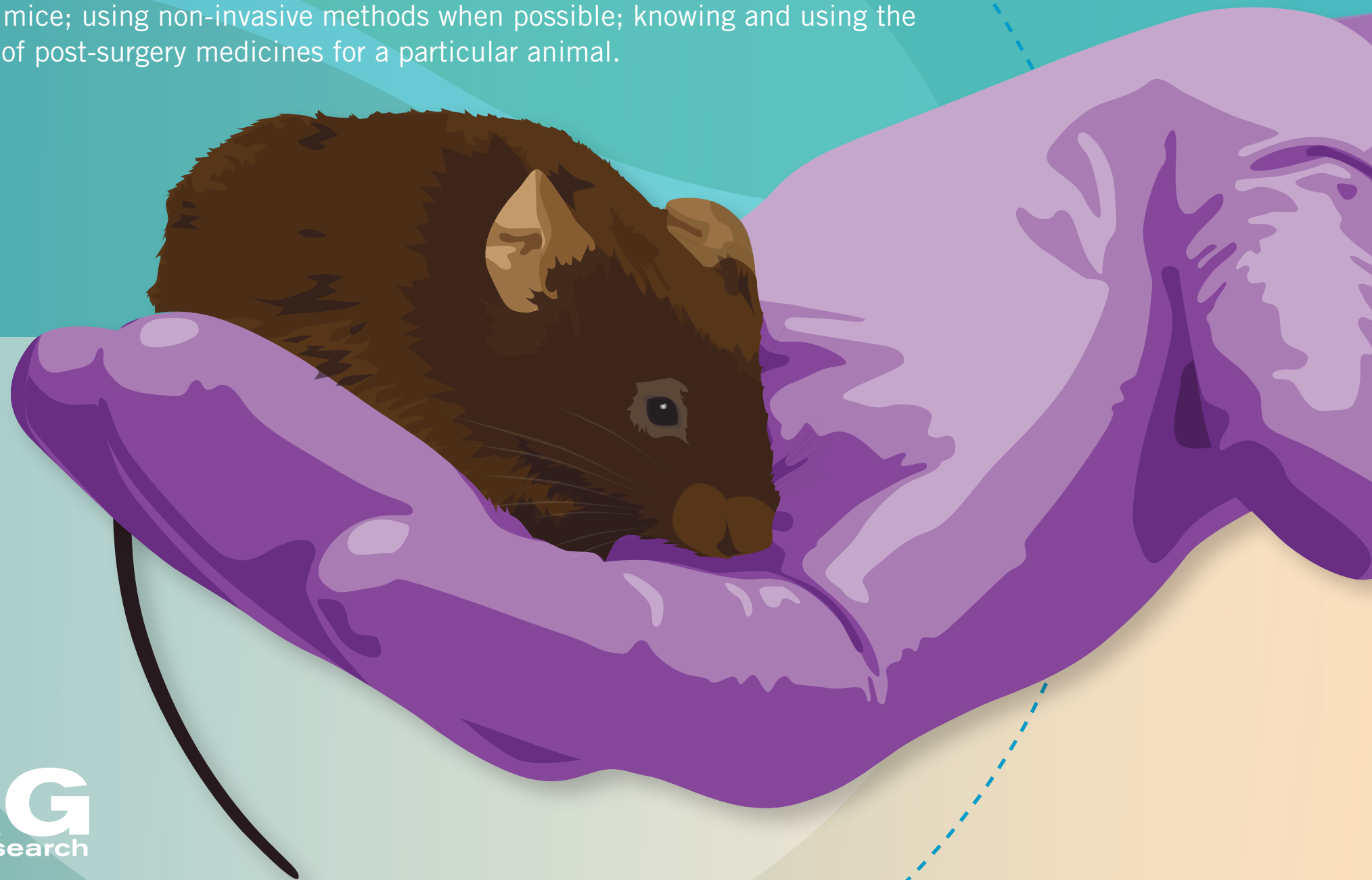
REDUCTION

Using the fewest number of animals possible in a research project to gain valid results.

Examples: Searching the literature and consulting with colleagues to ensure that experiments are not duplicated; relying on statistics to use neither too many, nor too few, animals in a study.

REFINEMENT

Using any technique or procedure that minimizes distress or enriches the life of an animal used in research.

Examples: Providing appropriate nesting materials and environmental enrichment for caged mice; using non-invasive methods when possible; knowing and using the best type of post-surgery medicines for a particular animal.

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