

Animal Numbers: Goldilocks and the Three Bears

Institutional Animal Care and Use Program (IACUP)



Why should I care?

- US Gov't Principles: "Principle III: The animals selected for a procedure should be of an appropriate species and quality and the minimum number required to obtain valid results.."
- PHS Policy: "D.1.: Applications and proposals...that involve the care and use of animals shall contain the following: a.) Identification of the species and the approximate number of animals to be used; b.) rationale for involving animals, and for the appropriateness of the species and numbers of animals to be used..."
- USDA AWR: "§2.31(e): A proposal...must contain the following: (1)
 Identification of the species and approximate number of animals to be used; (2) A rationale for involving animals, and for the appropriateness of the species and numbers of animals to be used..."



Why should I care?



How do I get started?



How do I get started?

- Identify each species that will be used in this study.
 For each species, state the number of animals in USDA pain category C, D, or E, whether they will be acquired or purchased, and/or bred within your study.
 For new applications, REQUEST AND JUSTIFY ANIMAL NUMBERS FOR 3 YEARS. You will not be able to request additional animals for 3 years except by modification of your protocol and approval by the IACUC.
- · Animal use must be kept to the minimum consistent with a sound scientific outcome.
- · Information entered into RIO-IACUC is species dependent, therefore, complete the ANIMALS page now. All animals must be accounted for, including neonates.
- USDA Pain Categories and Definitions

Review/Approval Notes:

When submitting an application for review and approval, you must include at least one Animal Species.

C.1

Research Species:									
	Species	USDA Pain Category	Acquired	Bred	Details				
Delete	Ferret	D	18	0	Click Here				
Delete	Gerbil	D	18	0	Click Here				
Delete	Guinea Pig	D	6	0	Click Here				
Delete	Hamster	D	18	0	Click Here				
Delete	Monkey, Macaque	D	8	0	Click Here				
Delete	Mouse	D	3000	400	Click Here				
Delete	Rabbit	D	35	0	Click Here				
Delete	Rat	D	450	100	Click Here				
Delete	Swine	D	27	0	Click Here				
Delete	Vole	D	18	0	Click Here				

Add Species

C.2

As required by federal regulations, describe the statistical tests (e.g. Power analyses) and/or other rationales (e.g. Tissue collection needs, breeding efficiency) that you used to determine the number of animals requested above. Note: The IACUC may require that you consult with a statistician from the UCSF Division of Biostatistics.

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Part of the rationale used to determine the total number of animals is based on an approximation of the number of training requests per year by species and the number of students who request additional specialized training. Numbers reflect past experience running IACUC-mandated training programs. We do not do work that allows for statistical analysis.

MICE:

Basic Hands-On Training and Specialized Techniques Training - Mice (500)

1 - 2 classes per week x about 50 weeks x approximately 15 animals (many of whom are used multiple times) = roughly 500 mice for basic classes per year (1500 / 3 years). Re-use is limited due to IACUC's current rule that training include hands-on euthanasia training.

IACUC Mandated Rodent Euthanasia Training - Mice

The present IACUC requirement is that new users take euthanasia training, regardless of how much pre-UCSF experience they have had thus we anticipate training about 500 new users per year who have no other training requirement, using about 500 mice /year or 1500 per 3 years.

We anticipate using 100 -150 per year for more advanced surgical/anesthesia training (anesthesia training mice may be re-used zero to approximately 10 times, while surgical training animals will be used only once), including animals used for photo/video training modules about 400 mice /

body p

Load 'em Up!

I got rejected. Now what?

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K.I.S.S Philosophy

- "We need # of experimental animals. No power analysis is available, because it is the first experiment of its kind. We are one of the pioneers of this technique"
- "We need # of experimental animals. We used this number in past experiments and found significant results, so we will continue to use this number."
- "We need # of experimental animals."

I got rejected. Again. Now what?

- How do we achieve a balance of descriptive text with power analyses, study designs, and other rationale with an easilydigestible tabulation of our animal numbers?
- How do we ensure that our animal numbers are arithmetically accurate and our study designs are not flawed?
- Find the balance between overpowering a study and using too many animals and underpowering a study and using too few animals (which may inevitably result in using more animals than originally required)

Animal Numbers Spreadsheet

Magnum Opus!

	A	В	С	D	Ε	F	G	Н	1	J	К	L	М
								Total animals required					
			Lines	Experimental		Outcomes	Experiment	to complete one	Model success				
1	Experiment	n (group size)	studied	groups	Time points	measured	replicates	experiment	rate (%)	Total animals required	Total acquired	Total bred	Arithmetic Error?
2	Circadian Rhythm												
3	Light/Dark cycle manipulation	12	34	1	2	1	1	816	100%	816	• C	• 816	No
	Running wheel activity												
4	monitor	12	39	1	2	1	1	936	100%	936		936	No
5	Behavior tests	12	14	1	2	3	2	2016	80%	2520	C	2520	No
	EEG/EMG/Optogenetics												
6	manipulation	10	28	2	3	1	1	1680	90%	1867	C	1867	No
7	Longevity-RNAseq												
8	Longevity-RNAseq	4	10	2	5	1	1	400	100%	400	80	320	No
9	Per3 Circadium Manipulation												
10	Depression Screening	12	5	2	1	1	2	240	100%	240	C	240	No
										•			
		•											=IF(SUM(K#:L#)=VALUE(J#)
	Text	#	#	#	#	#	#	=PRODUCT(B#:G#)	#	=ROUNDUP(H# /(I#), 0)	#	#	,"No","YES! Check math!")
									Total Cat D	6779	* 80	6699	No
													=IF(SUM(K#:L#)=VALUE(J#)
										=SUM(J#:J#)	=SUM(K#:K#)	=SUM(L#:L#)	,"No","YES! Check math!")

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Running wheel activity							
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Behavior tests	12	14	1	2	3	2	2016
EEG/EMG/Optogenetics							
manipulation	10	28	2	3	1	1	1680
Longevity-RNAseq							
Longevity-RNAseq	4	10	2	5	1	1	400
Per3 Circadium Manipulation							
Depression Screening	12	5	2	1	1	2	240
	•						
Text	#	#	#	#	#	#	=PRODUCT(B#:G#)

Magnum Opus!

Н	1	J	К	L	М		
Total animals required							
to complete one	Model success						
experiment	rate (%)	Total animals required	Total acquired	Total bred	Arithmetic Error?		
816	100%	816	• 0	e 816	No		
936	100%	936		936	No		
2016	80%	2520	0	2520	No		
1680	90%	1867	0	1867	No		
400	100%	400	80	320	No		
240	100%	240	0	240	No		
		•					
•					=IF(SUM(K#:L#)=VALUE(J#)		
=PRODUCT(B#:G#)	#	=ROUNDUP(H# /(I#), 0)	#	#	,"No","YES! Check math!")		
	Total Cat D	6779	* 80	• 6699	No		

Does it work?

	N	Averag range of approva	ge and f time to al (days)	# (%) applications with revisions requested
Pilot PIs	10	53.7	24 - 72	3 (33%)
All other PIs	100	61.5	14 - 183	44 (44%)

Where do we go from here?

- Integrated sample size calculator
 - Plug in: statistical test, effect size, standard deviations, alpha, and power
 - Return out: sample size
- Breeding calculator
 - Plug in: # of experimental animals, specific breeding efficiencies, and % desired sex/genotype/etc.
 - Return out: # of breeders
- RIO integration
 - "Plug'n'Chug"

