

## Rat Vocalizations as currently known

Rat	Juvenile and Adult		Pups
Frequencies	22-kHz vocalizations'		40 kHz vocalizations
Bandwidth	18-32 kHz		30-65 kHz
duration of calls	1 to 6 kHz		
Sound Pressure Level	300-4000 ms		
	65 to 85 dB		
Affective state	negative*		positive
Behavioral situation	aversive		nonaversive
	exposure to predators	sexual behaviors	seperation from mother or litter
	inescapable pain	male agonistic behaviors during fighting	
	response to startling noises	juvenile play	
	intermale agression	manual tactile stimulation ('tickling') by experimenters	
	social defeat		
	distressing events		
	response to stimuli associated with distressing experiences		
Behaviors exhibited			
	tense	locomotor activity (approaching another rat, rearing, exploring)	licking or search
	motionless couching ('freezing')		retrieval behavior
	pronounced breathing		

\* The exception of the 22kHz call reflecting negative affect is when male rats emit a vocalization with energy around 22kHz after copulation (a behavior not normally considered aversive)

## Mouse Vocalizations as currently known

Mice	Adults		Pups
	male	female	
Frequency range	30-110 kHz		above 35 kHz (2 categories)
			group1      group2
			around 70 kHz    around 100 kHz intercall interval 200 ms
Housing environment	diversity and complexity of vocalizations		
single gender lab cages		Less	
enriched cages (socially and environmentally)		More	
Behavioral situation	nonaggressive interactions**		distressing
	male mice encounter female mice	when pups removed from nest	isolated from mother
	male mice encounter female mice	female-female interactions	exposed to cold
	urinary phermones	when alone	
		when having pups and litter is removed	
Syllable types* :			
frequency modulated			
down-sweeps	exposed to female phermones		
u-shaped		when pups removed from nest	
up-sweeps	exposed to female phermones		
constant frequencies			
hump-shaped	exposed to female phermones		

\* Syllable is defined as an unit of sound seperated by a silent period before another sound and is based on the following acoustic parameters: starting frequency, ending frequency, frequency with peak energy, frequency modulation, and duration.

\*\*In contrast to rats, adult mice do not produce ultrasonic vocalizations during aversive situations. Also ultrasonic vocalizations in mice have not been shown to indicate negative or positive affect. Therefore, the function of ultrasonic vocalizations in