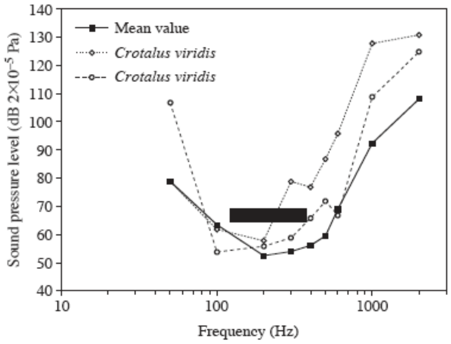
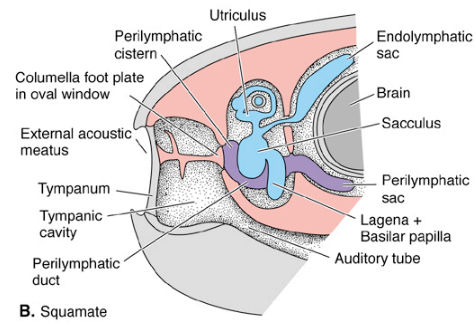
Biology 452
Squamate Lecture Exercise 6



The black rectangle represents the frequency & intensity of the stimuli presented during these experiments.
Young, BA & A Aguiar 2002. Response of western diamondback rattlesnakes *Crotalus atrox* to airborne sounds. J. Exp. Biol. 205:3087–3092.



Cross-section of a Lizard head to show the middle & inner ear.

1. What range of frequencies is "easily (< 80dB) detected" by these snakes based on the graph above.

Approximately 80-800 Hz

2. How is the ear of a snake modified from the lizard design shown above?

Snakes lack eardrums (no tympanic membranes)!

Because of that design change, would you expect the snake to hear higher or lower frequencies than a lizard, on average?

Snakes hear only lower frequencies. (< 1000 Hz) easily.

3. Does this chameleon below have 1 or more foveas in its retina, based on this retinal map? Yes or no?

Yes

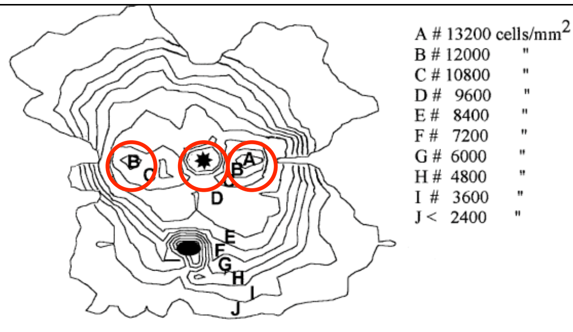
Circle any that are present.

4. Does this diurnally active "iguanian" lizard have monochromatic, dichromatic or trichromatic vision?

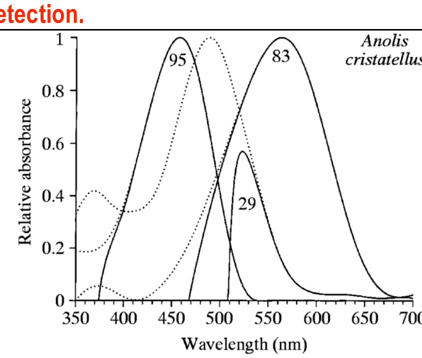
Trichromatic

How do oil droplets alter the visual perception of the *Anolis*?

Narrowed each photoreceptor's visual spectrum, to refine color detection.



Total cell density in retina of a chameleon.
Black oval = optic disc (blind spot); star = A density



Effects of oil droplets on the *Anolis cristatellus* visual pigments. Solid lines = specta with oil droplets, dashed lines = without oil droplets.

El Hassni, M, et al. 1997. Quantitative & topographical study of retinal ganglion cells in the Chameleon (*Chameleo chameleon*). Brain Research Bull. 44(5):621–625.

Loew, ER, LJ Fleishman, RG Foster, and I Provencio, 2002. Visual pigments and oil droplets in diurnal lizards: a comparative study of Caribbean anoles. J Exper. Biol. 205:927-938.

5. List 1 difference between snake eyes & lizard's eyes. Would you expect snakes to have trichromatic vision if their ancestors were burrowers?

Snakes lack eyelids & have a spectacle over the eyes instead. (Also present in some geckos). Lens is yellow, & papillary cone is reduced in snakes. Snakes have dichromatic color vision, although some have high visual acuity.