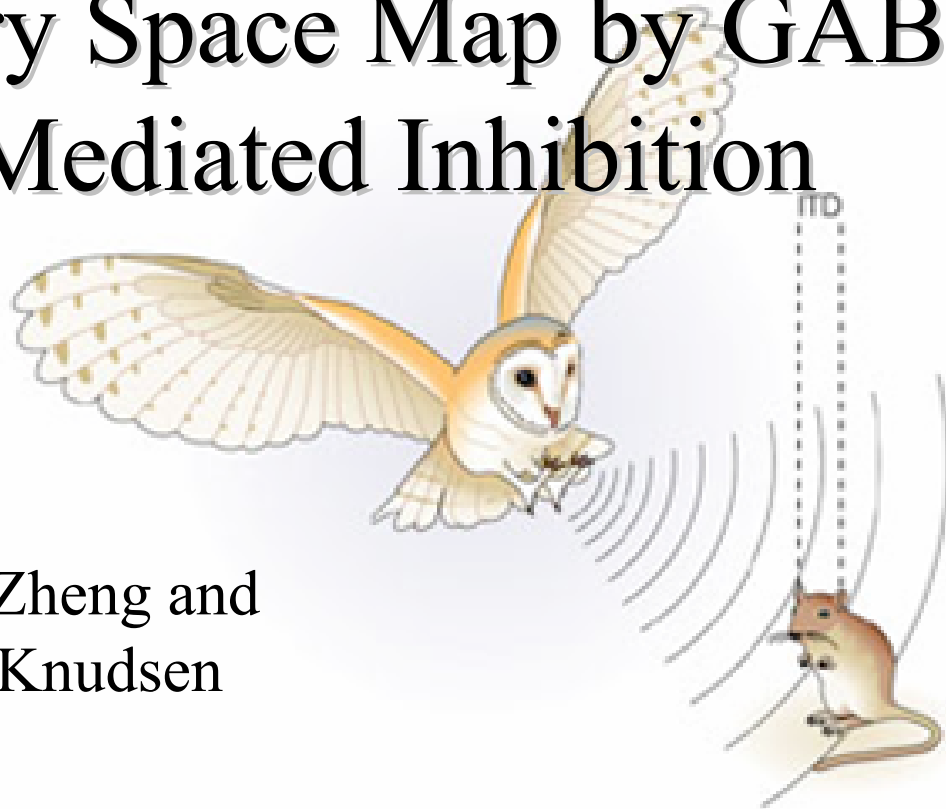


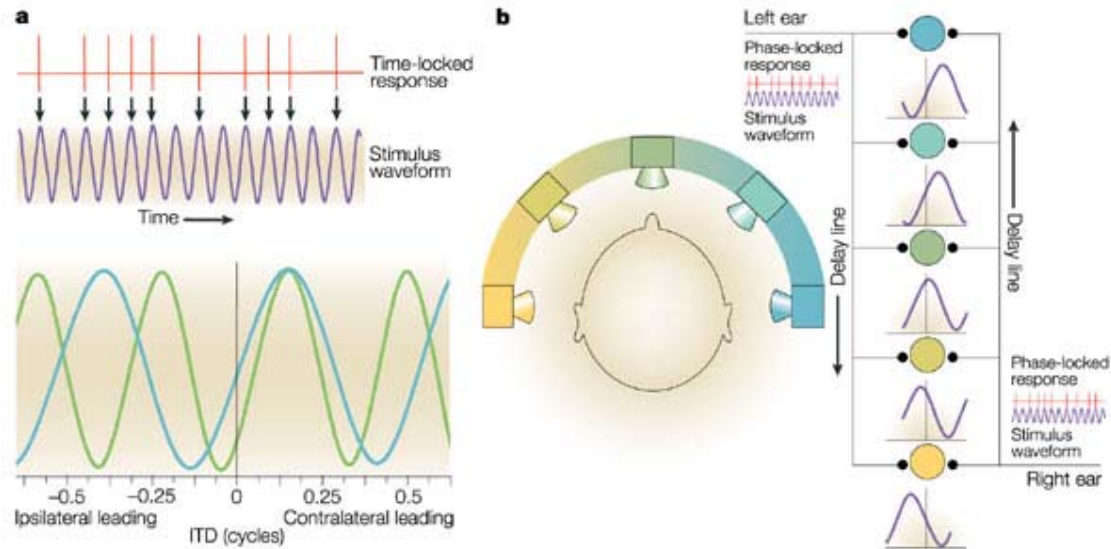
Functional Selection of Adaptive Auditory Space Map by GABA_A-Mediated Inhibition

Weimin Zheng and
Eric I. Knudsen

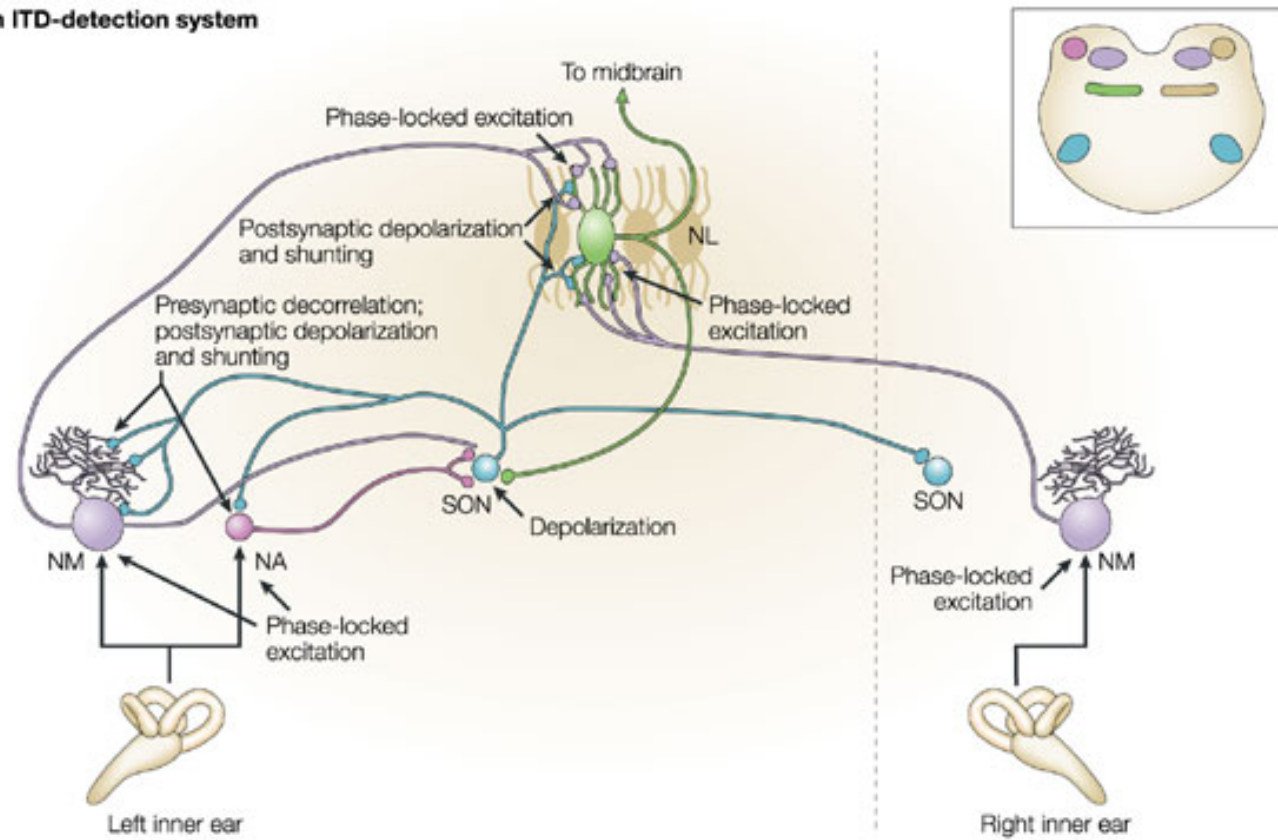


presented by Beau Cronin

Jeffress Model



b Avian ITD-detection system

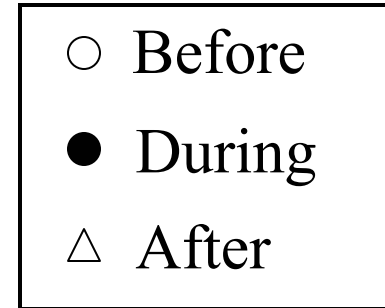
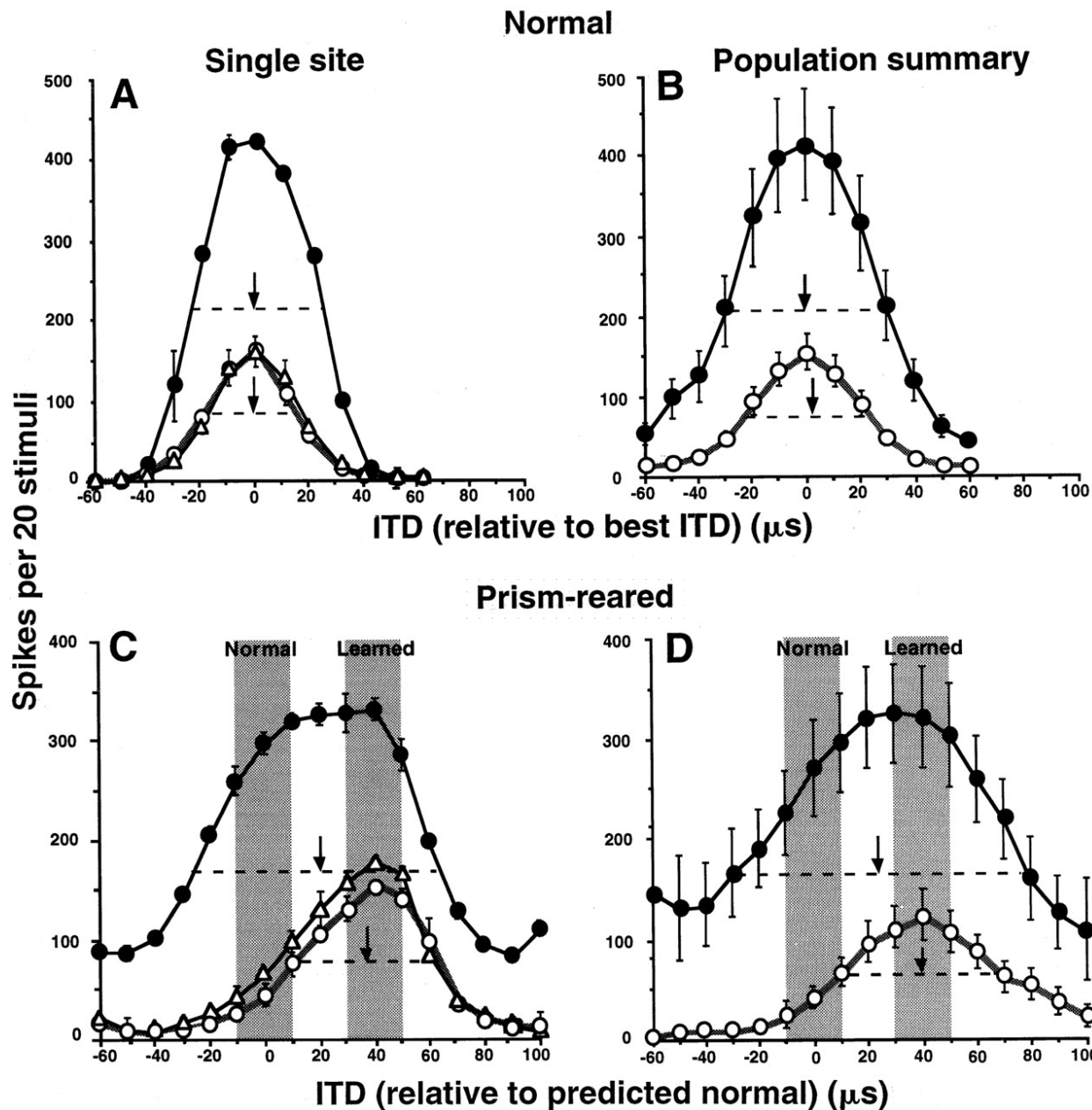


In a nutshell

- Barn owls raised with horizontally-displacing prisms in front of their eyes *after a normal map has had time to form*
- Over time, the ITD map in the ICX is shifted relative to normal in order to compensate for the prisms' effect
- This new map (“learned”) does not replace the old map (“normal”)
 - ➔ *Blocking of inhibition by bicuculline can restore “normal” responses*

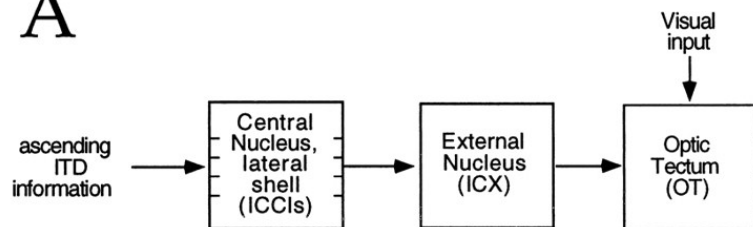
Some notes

- “Effectiveness of inhibition” is the ratio of normal response to disinhibited response
- An “ITD channel” is, I think, just a particular ITD value

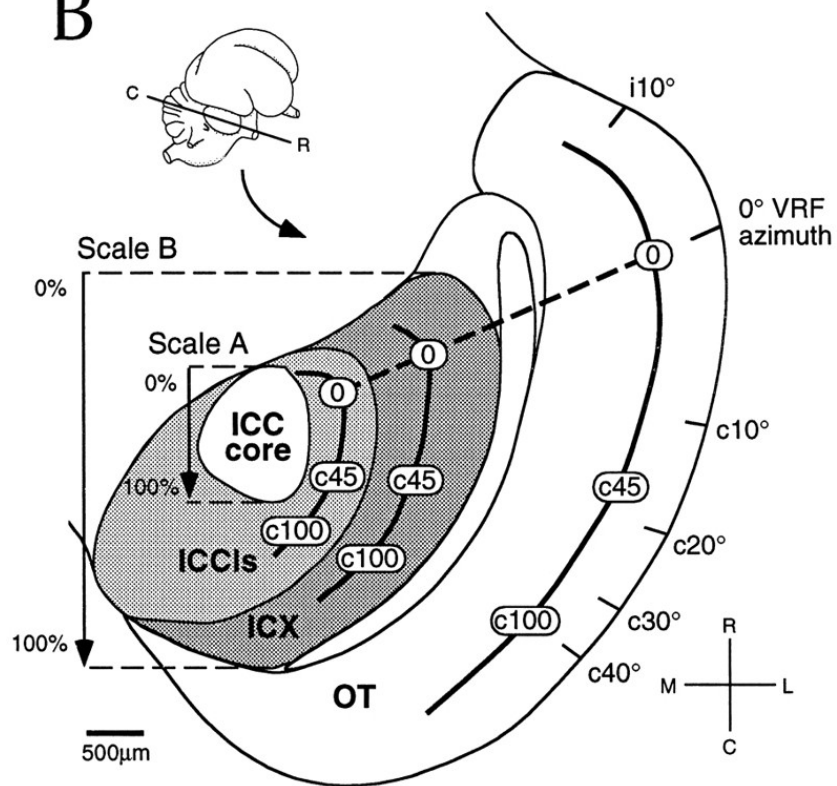


“...the increase in responses that resulted from blocking inhibition indicated the effectiveness of the inhibition that was activated by the respective ITD input channels to that site.”

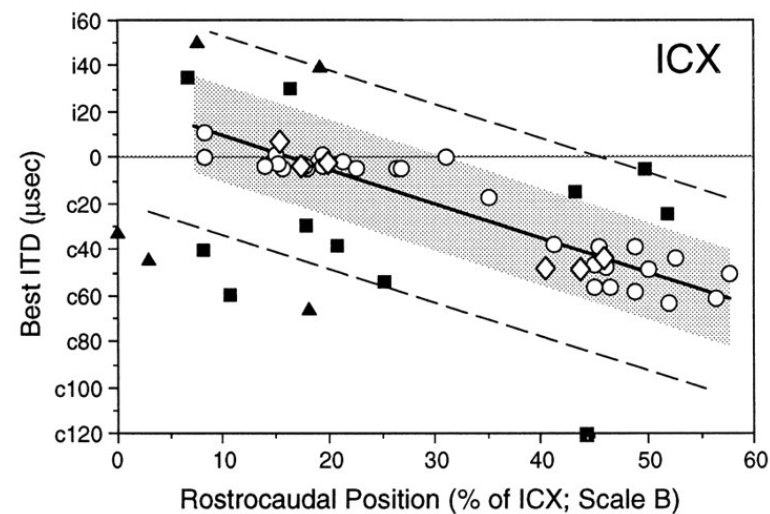
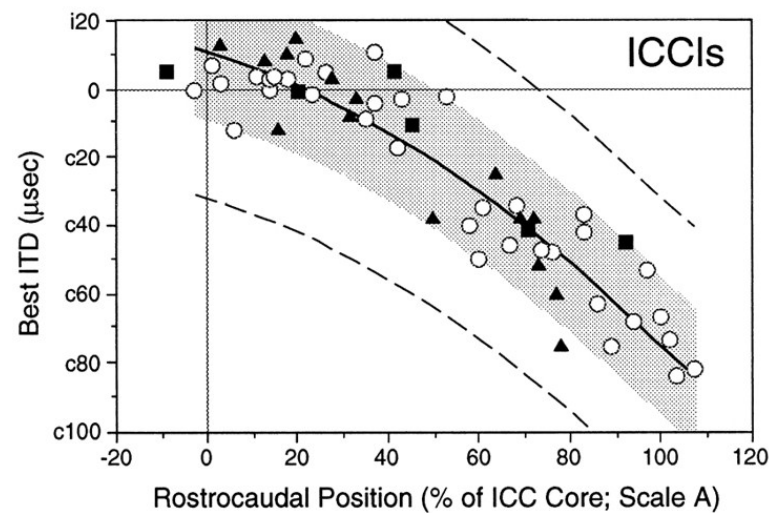
A

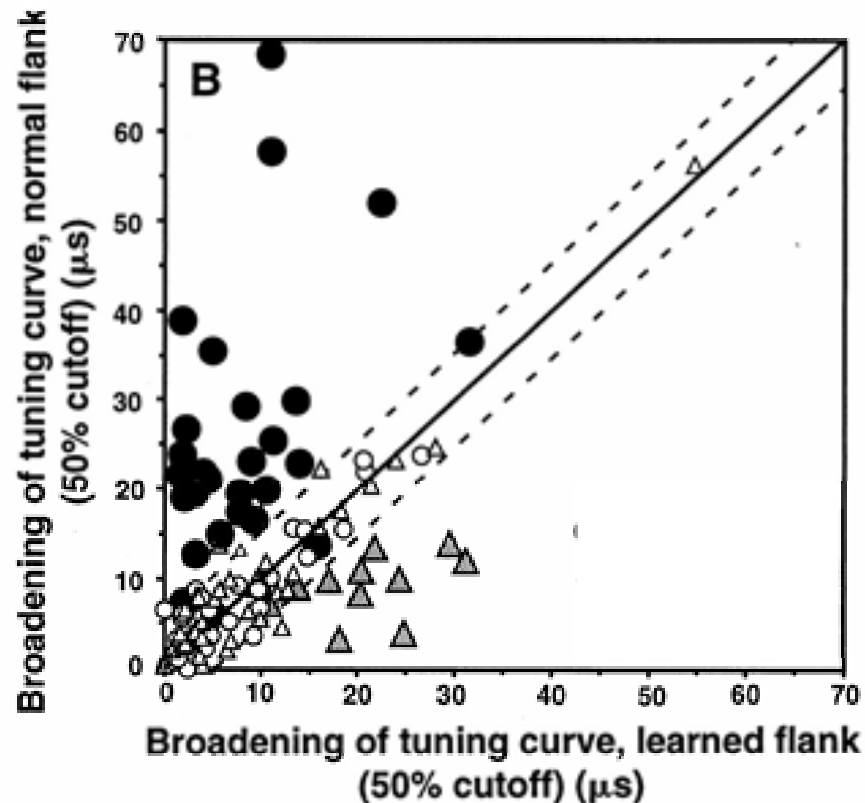
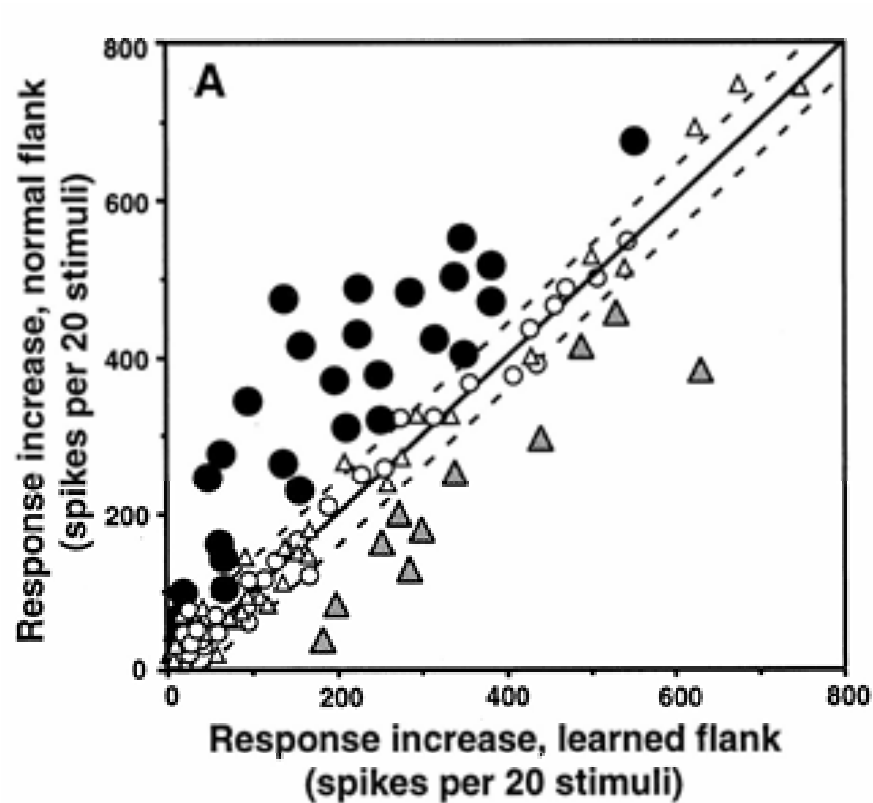


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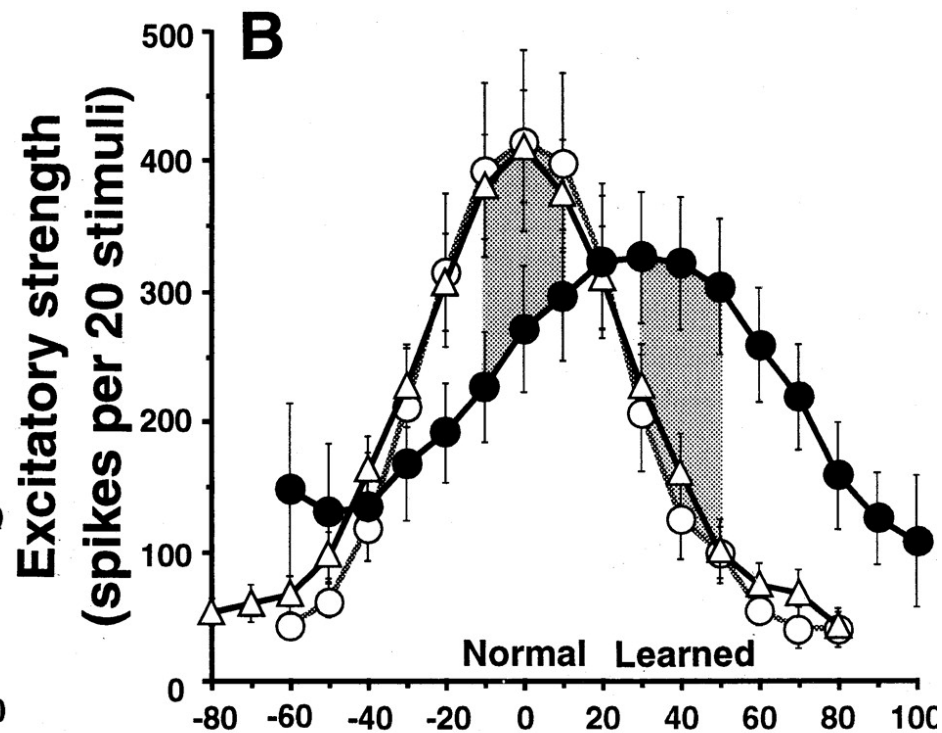
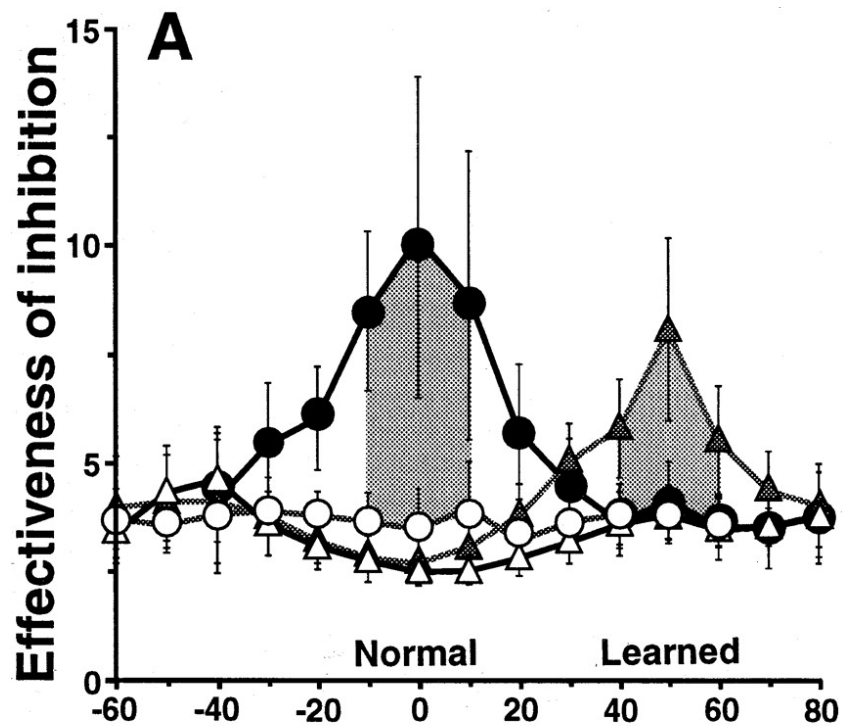


C

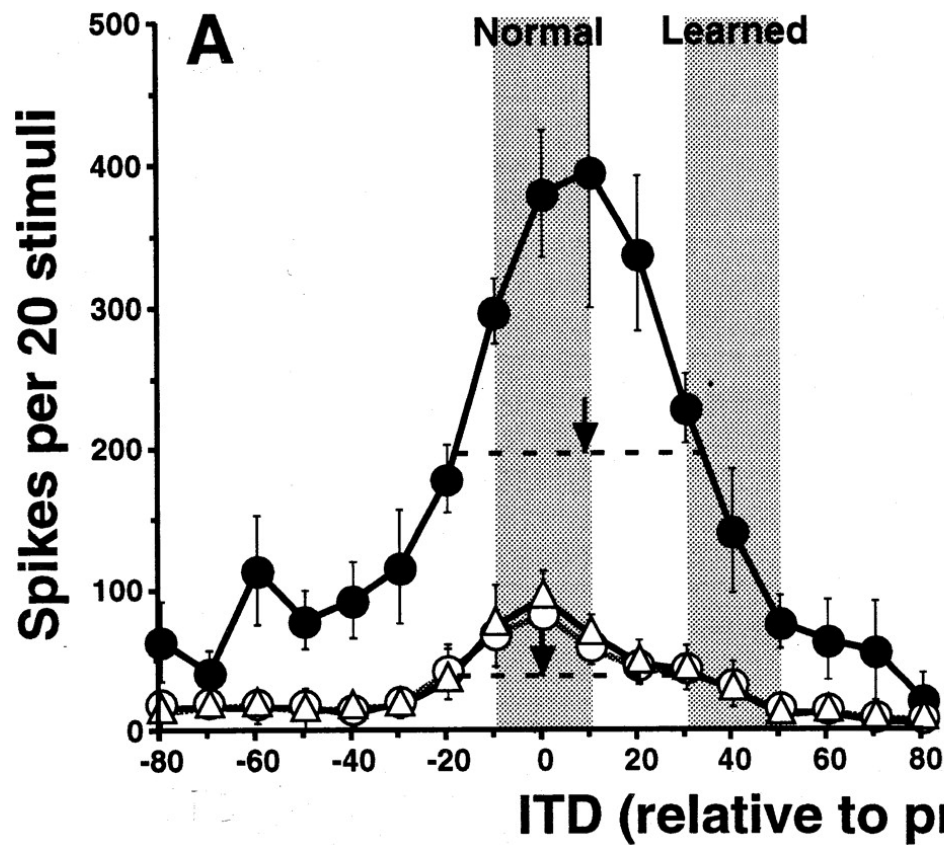




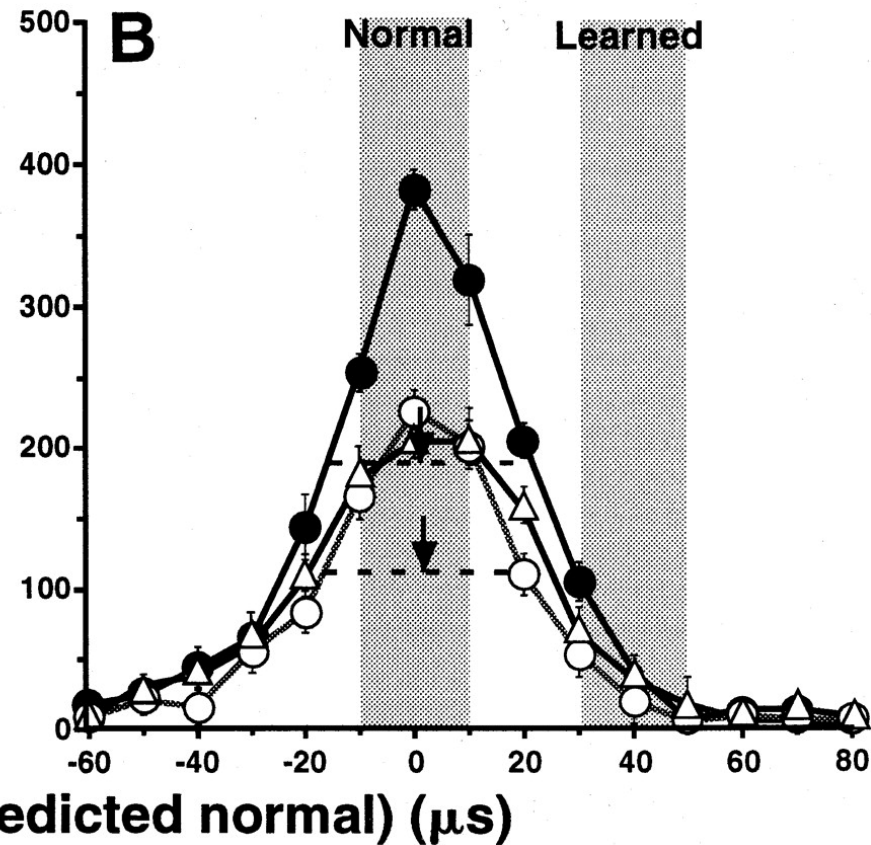
- Normal
- Prism-reared
- ▲ Prisms Removed
(partially returned)
- △ Prisms Removed
(fully returned)



- Normal
- Prism-reared, fully shifted
- ▲ Prisms removed, before recovery
- △ Prisms removed, after recovery



Transitioning to Normal



Fully returned to Normal

○ Before

● During

△ After

Interpretation

- Learning involves a “parallel adjustment of input strengths to excitatory and inhibitory circuitry”
- The ICX maintains two separate maps of auditory space, with the currently inappropriate one being suppressed through “abnormally strong” inhibition
- This role for inhibition may be related to that found by Hensch et. al. in the modification of ocular dominance columns