

# Parasites, Zombies (and you)

## 1. Jewel Wasp

Tea Talk  
02/07/2013





# a real-life zombie movie

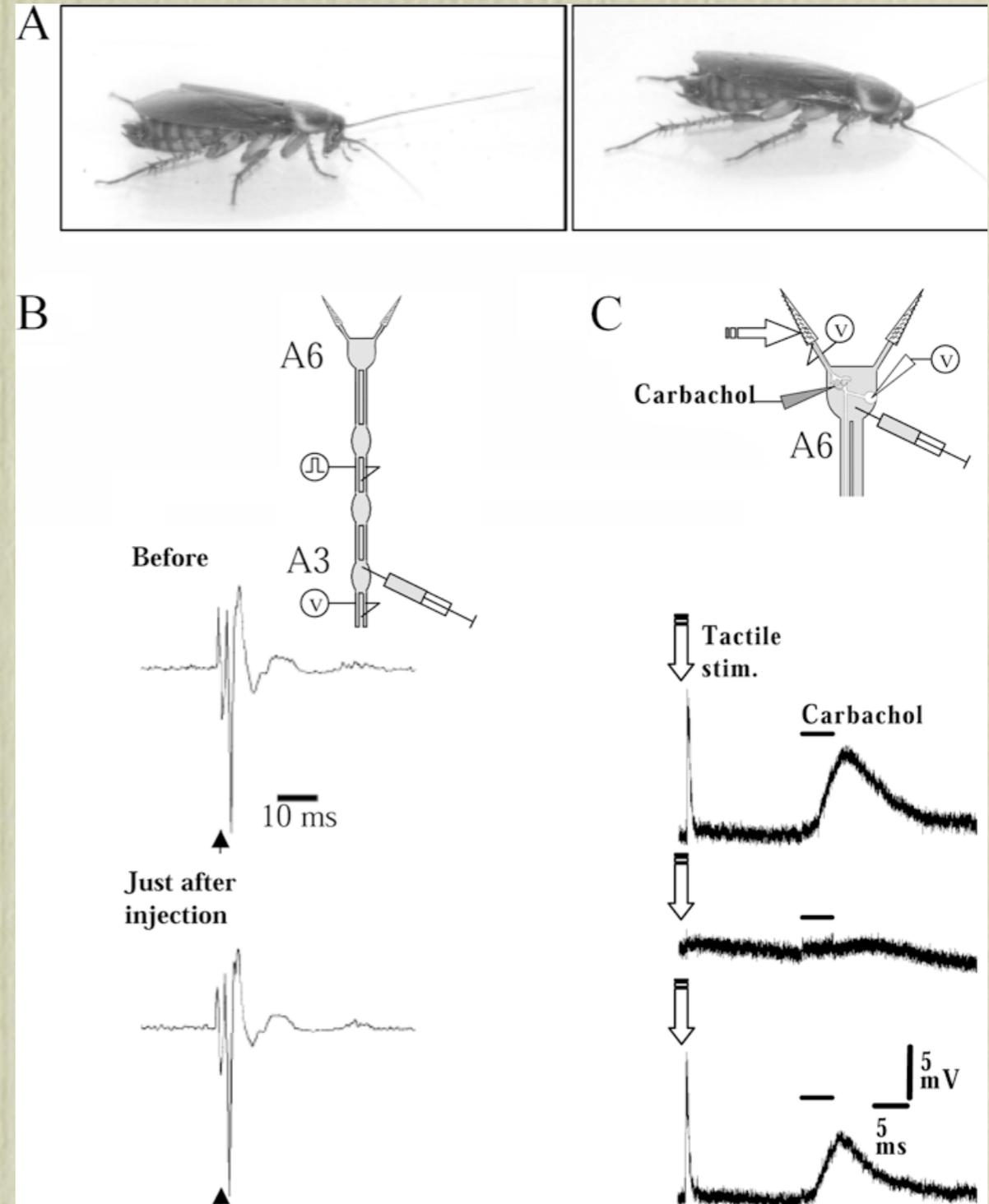
ADAPTED FROM:

"The wasp *Ampulex compressa*, a predator of the cockroach *Periplaneta americana*"; by Wijnand Heitmans; University of Amsterdam



# Thoracic shot - short term paralysis

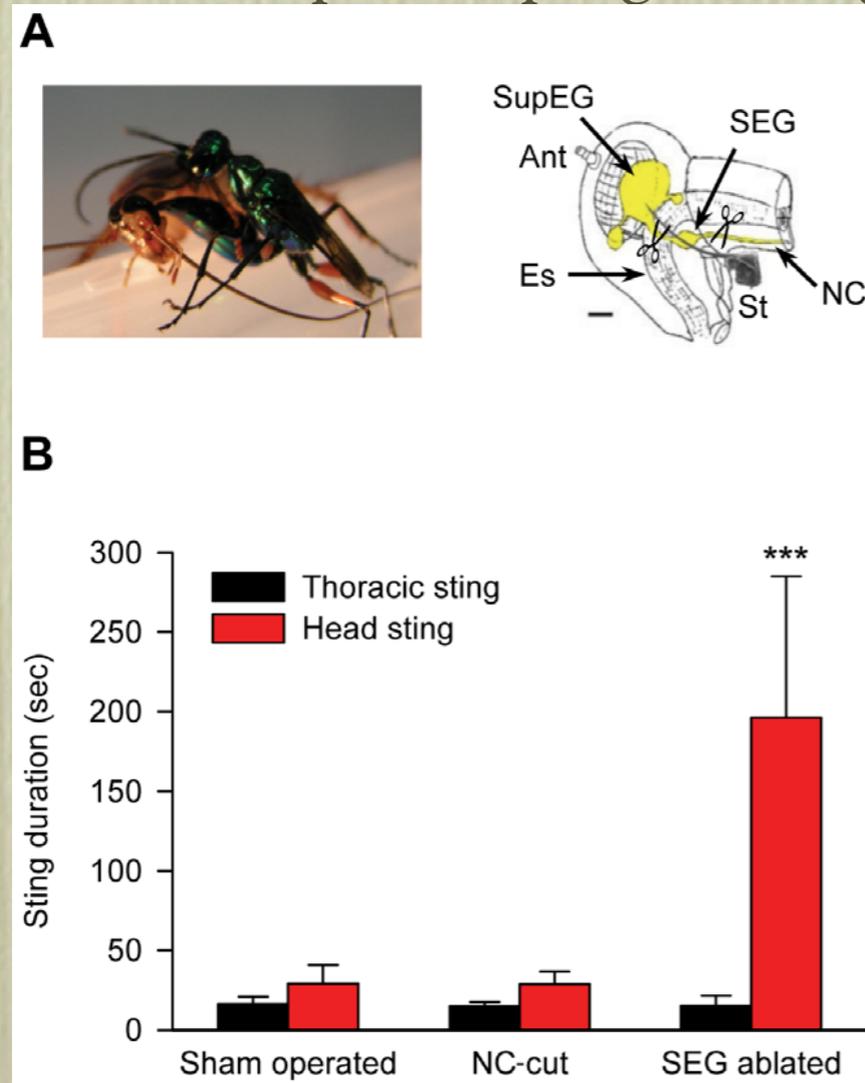
- immediate effect
- last 2-3 minutes
- central cholinergic synaptic block



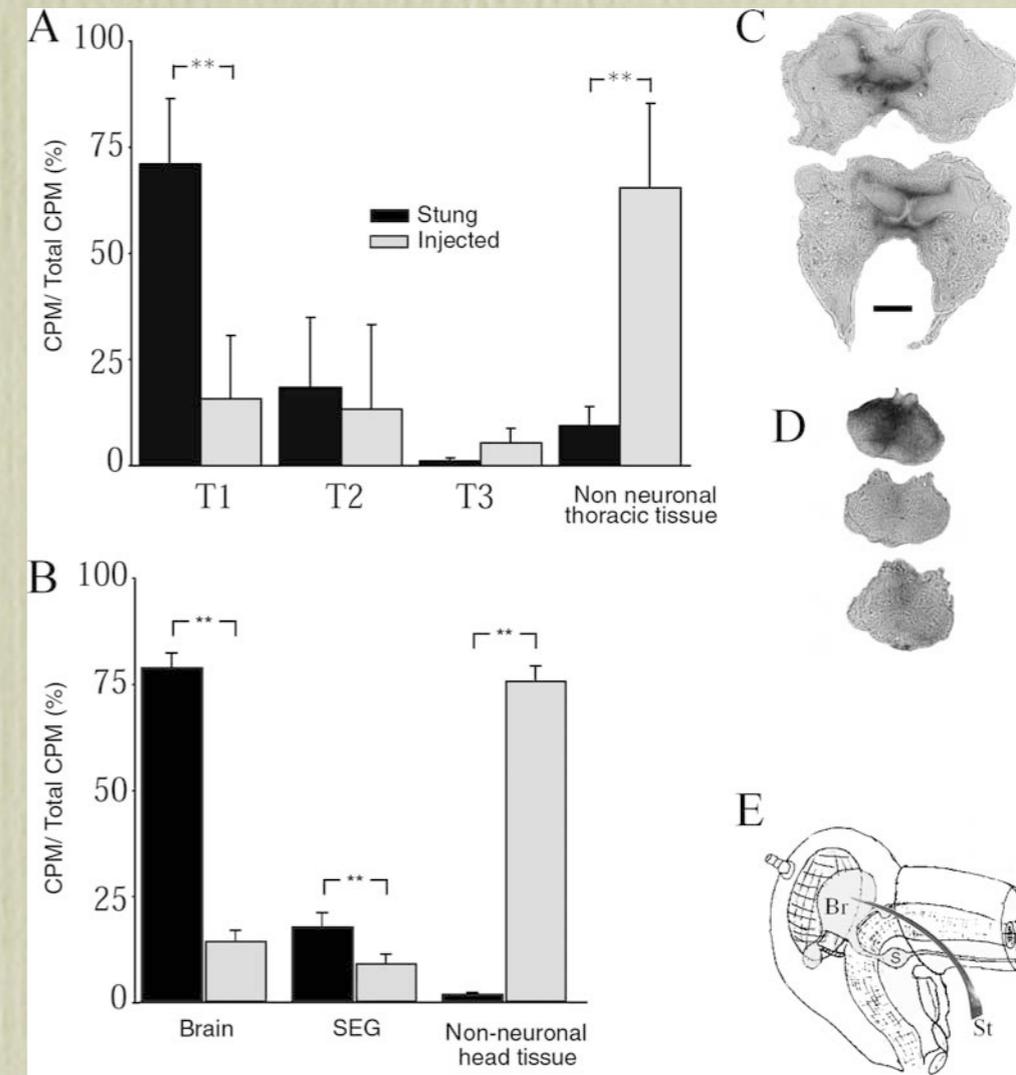
Liberset. J Comp Physiol A (2003)

# Head shot

- requires active search
- accurate injection to SEG, and SupEG.  
(Sub- and Supra-Esoophageal Ganglia)



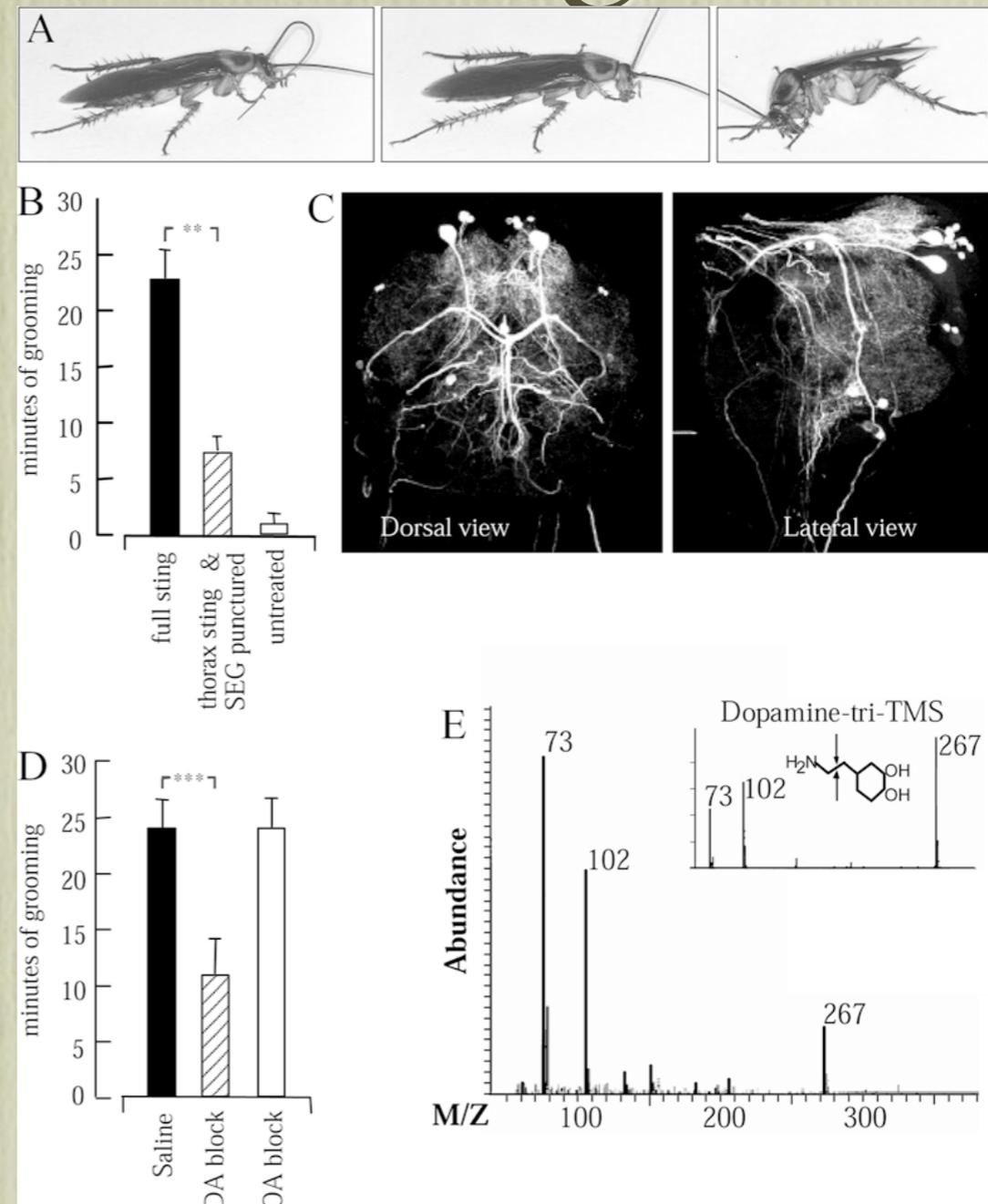
Gal R, Libersat F. PLoS ONE (2010)



Libersat. J Comp Physiol A (2003)

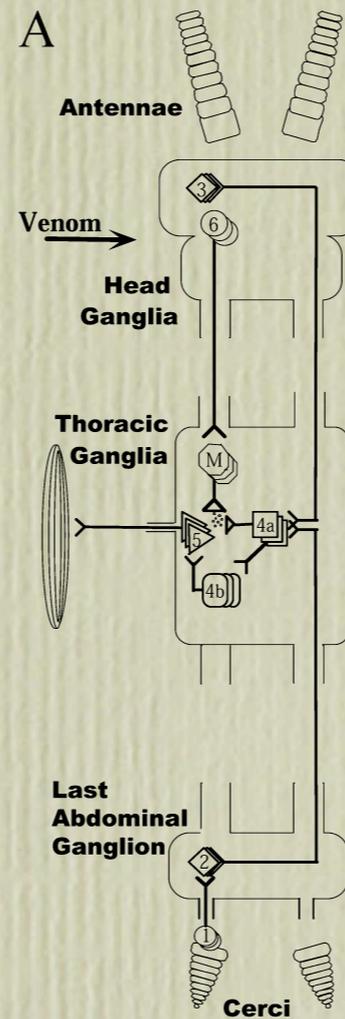
# Head shot - Excessive Grooming

- Lasts 30 minutes
- Increased threshold for escape behavior
- Induced by dopamine

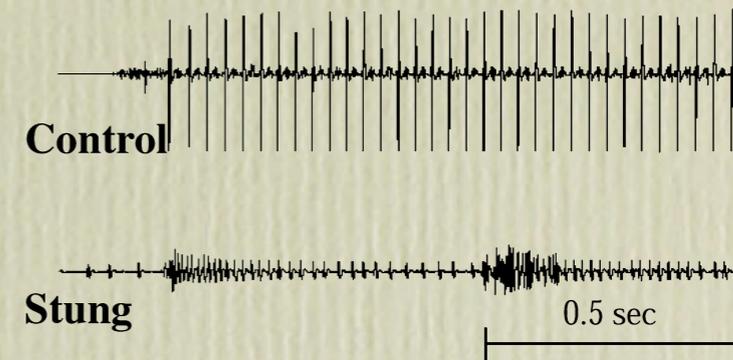


# Head shot - Hypokinesia

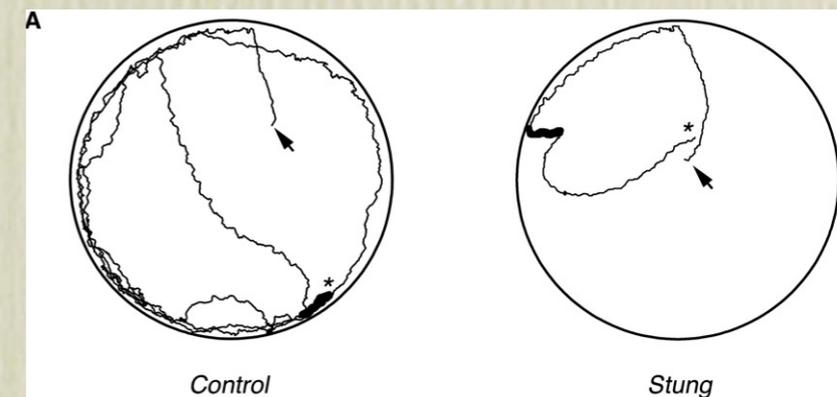
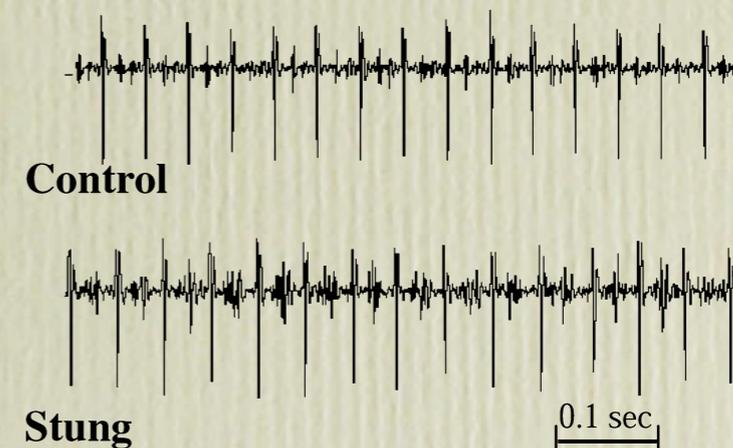
- Decreased motivation for locomotive behavior
- Other behaviors (grooming, righting, or flying) are little affected.
- Lasts 2~5 weeks



## B Escape behavior



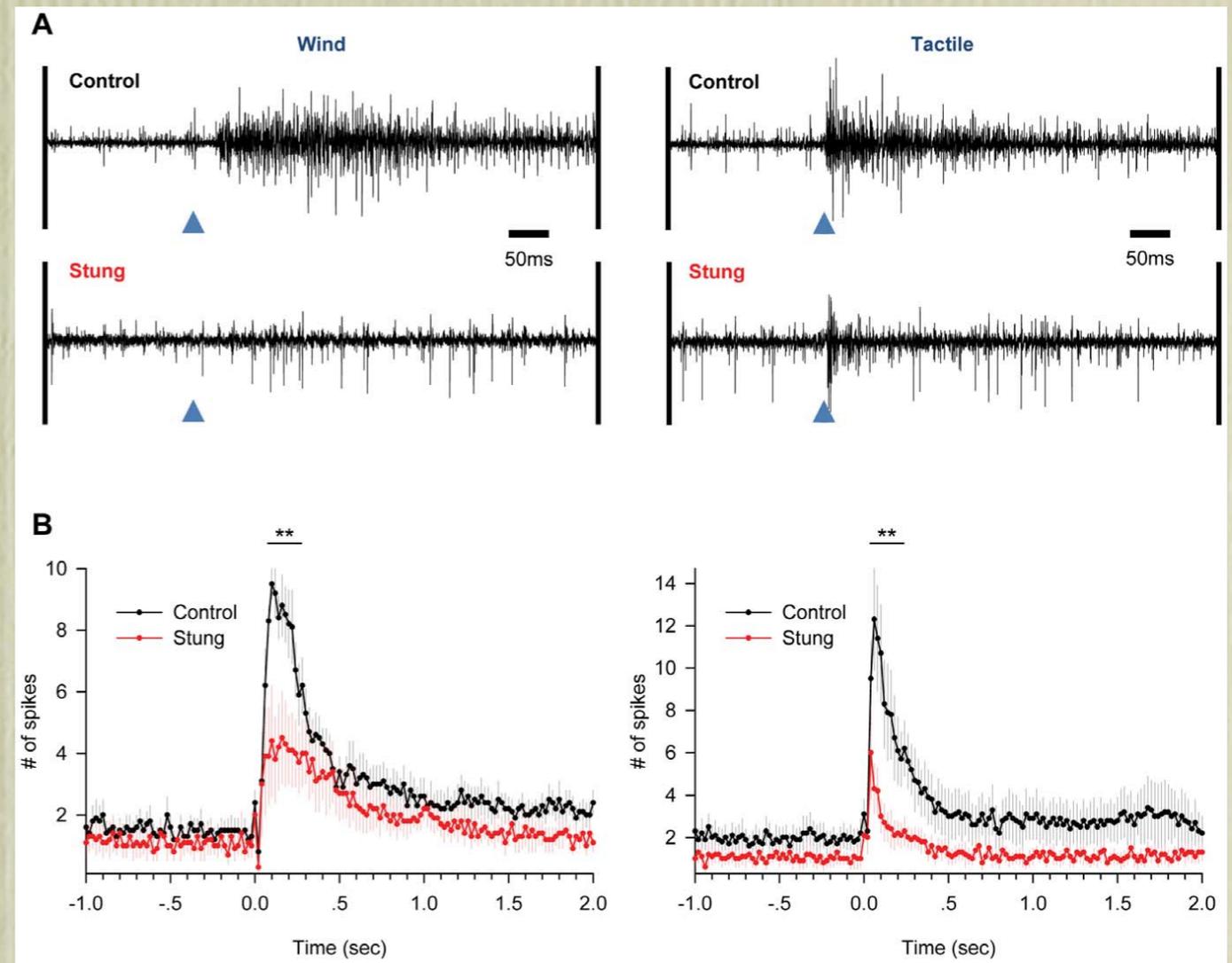
## C Flying behavior



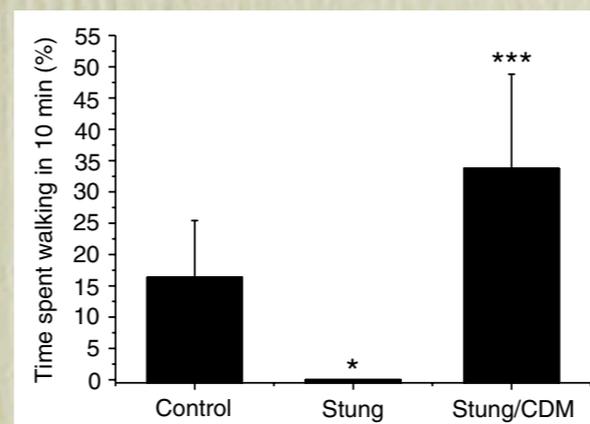
Liberset. J Comp Physiol A (2003)

# Head shot - Hypokinesia

- Mediated by decreased activity in SEG
- Injecting the venom or sodium channel blocker in SEG reproduces the deficit. (not in SupEG)
- Locomotion is restored by injecting octopamine in SupEG (and suppressed by octopamine antagonist. hmm...)



Gal R, Libersat F. PLoS ONE (2010)



Rosenberg, Glusman, Libersat. J Exp Bio (2008)

**Method:** Procaine was freshly prepared and dissolved to a concentration of 500 mg/ml. **Venom was freshly milked from 10 wasps as described previously [].**

# Conclusion

- SEG seems to be the neural substrate for motivating specific motor behaviors



Happy  
Ending

# Coming up next...

- more zombies...



Phillips K J Exp Biol 2007;210:iii-iii

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