



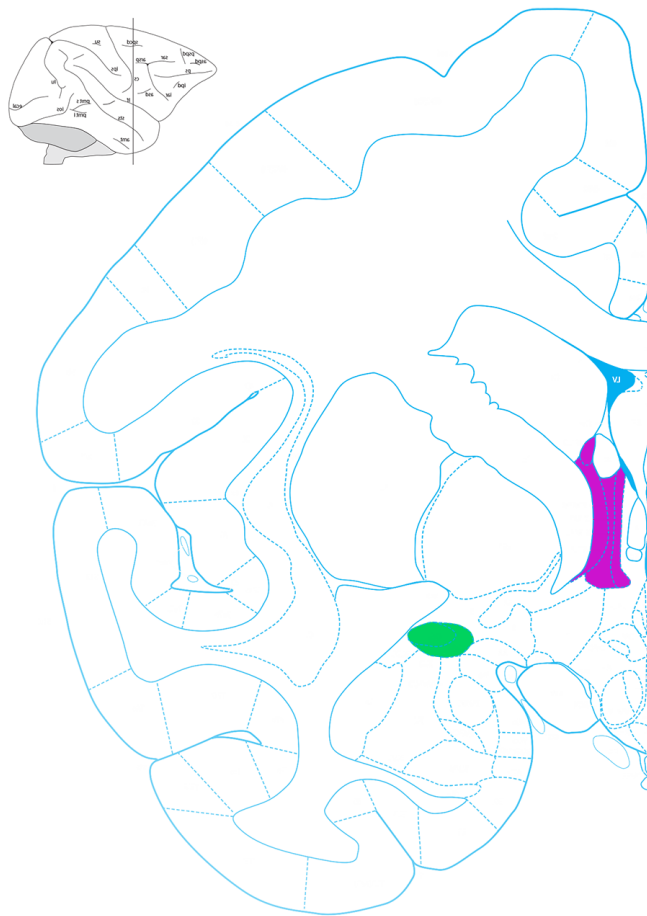
**HEALTH**Emotions  
.....  
**RESEARCH INSTITUTE**  
UNIVERSITY OF WISCONSIN



# Structural and functional connectivity of the extended amygdala in newborn monkeys

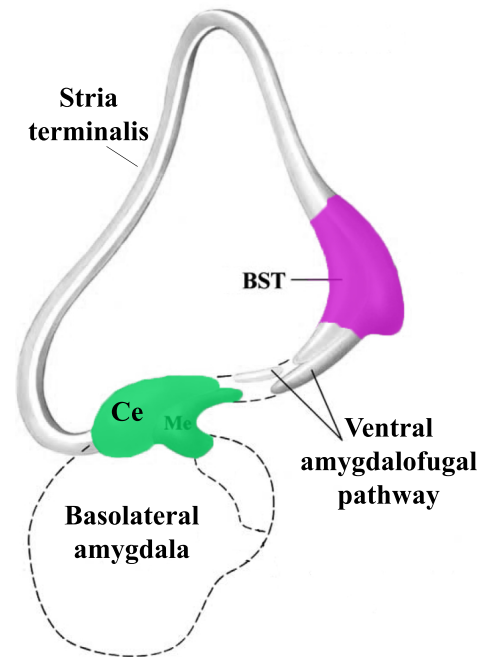
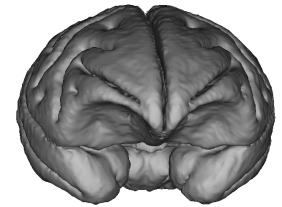
**Do Tromp**, Jonathan Oler, Andrew Fox, Alexander Shackman,  
Julie Fudge, Richard Davidson, Rasmus Birn, Andrew Alexander  
and Ned Kalin

October 2012 - SFN

# The concept of the extended amygdala



-  Central nucleus of amygdala (Ce)
-  Bed nucleus of stria terminalis (BST)

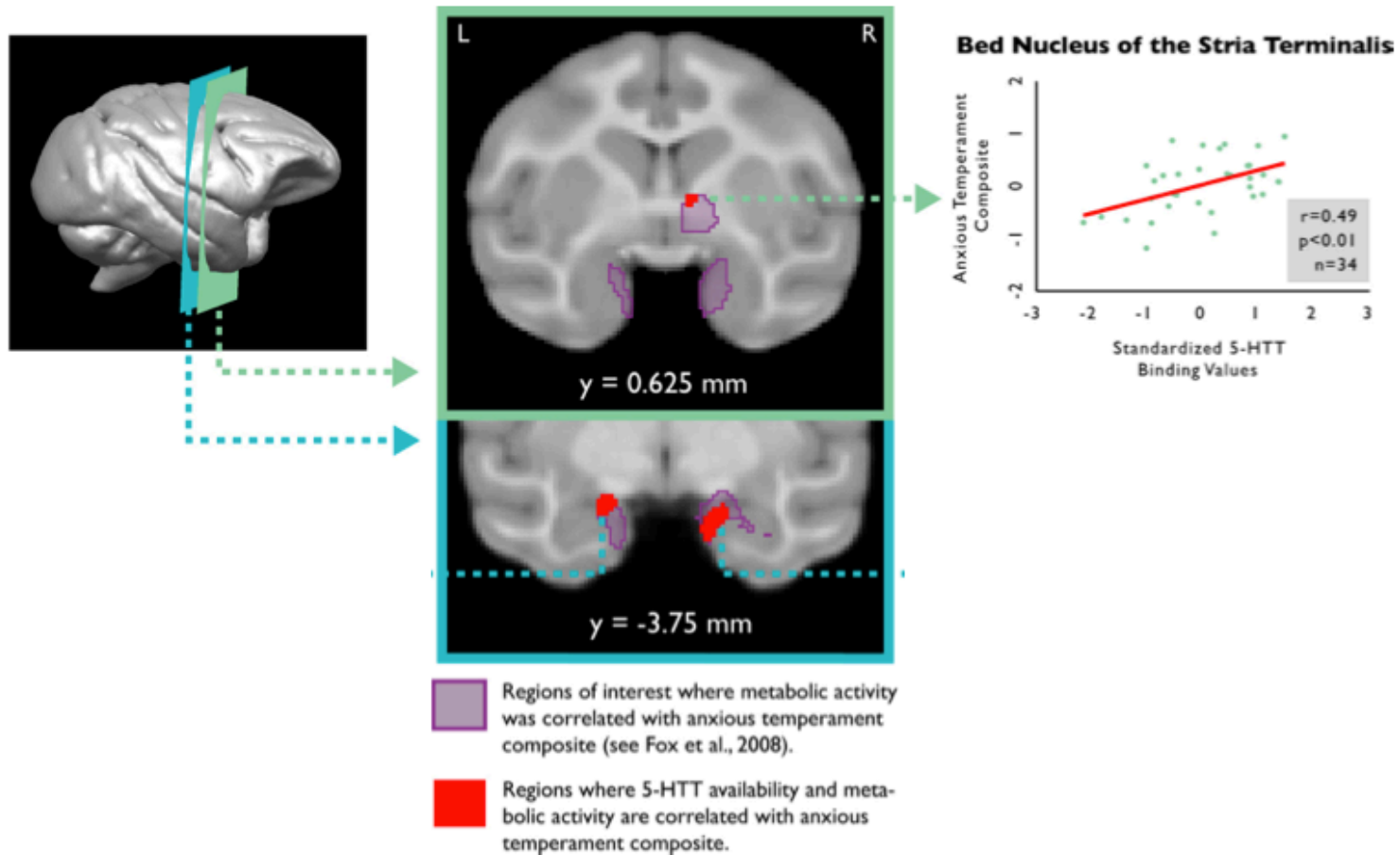


Adapted from Paxinos, Huang, Petrides and Toga (2008)

Adapted from Heimer, de Olmos, Alheid, et al. (1999)



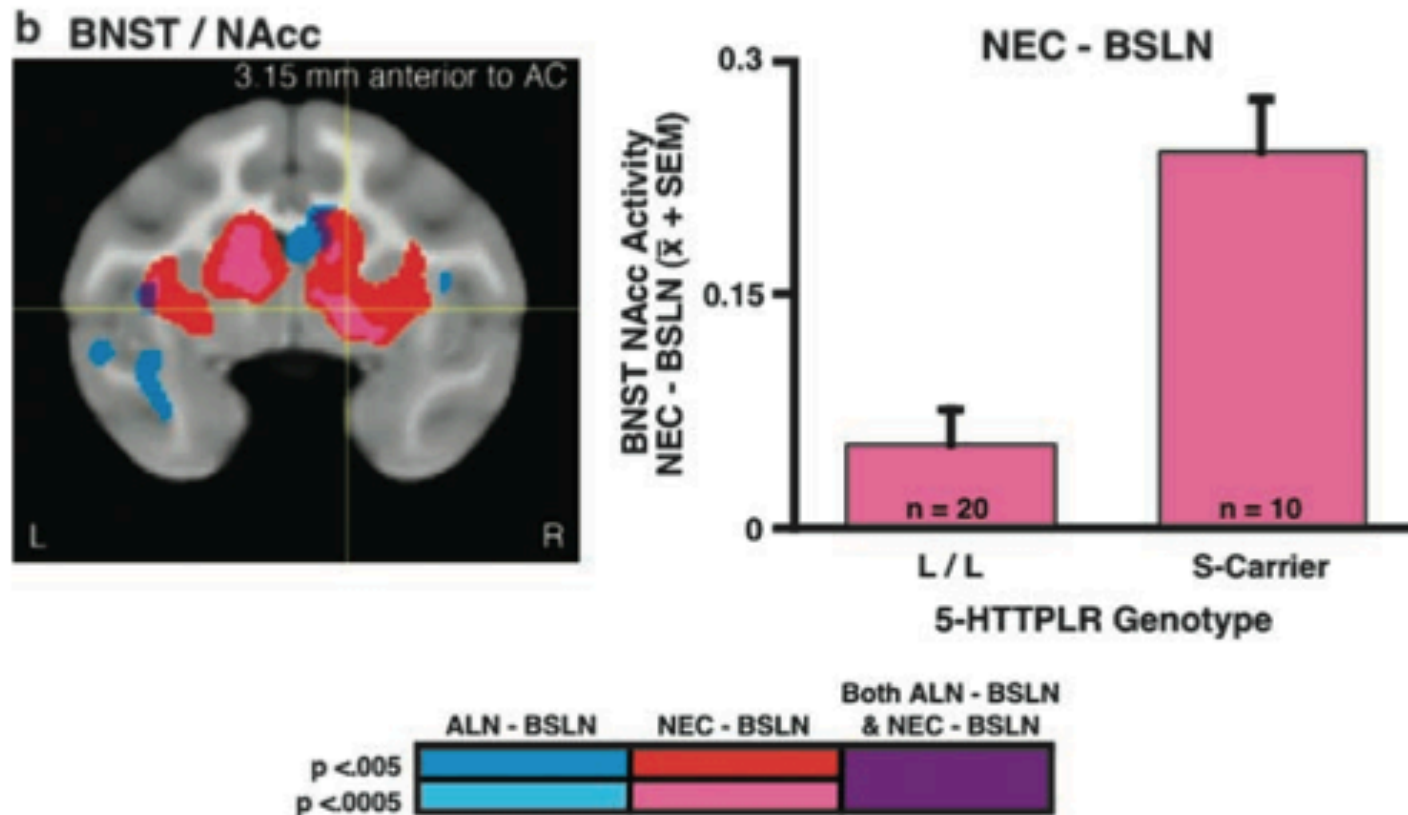
# Serotonin transporter availability in the amygdala and BST predict AT and brain glucose metabolism



Oler, Fox, Shelton, Christian, Murali, Oakes, Davidson, and Kalin (2009)



# BST activation is modulated by the Serotonin Transporter Repeat Polymorphism (5-HTTLPR)

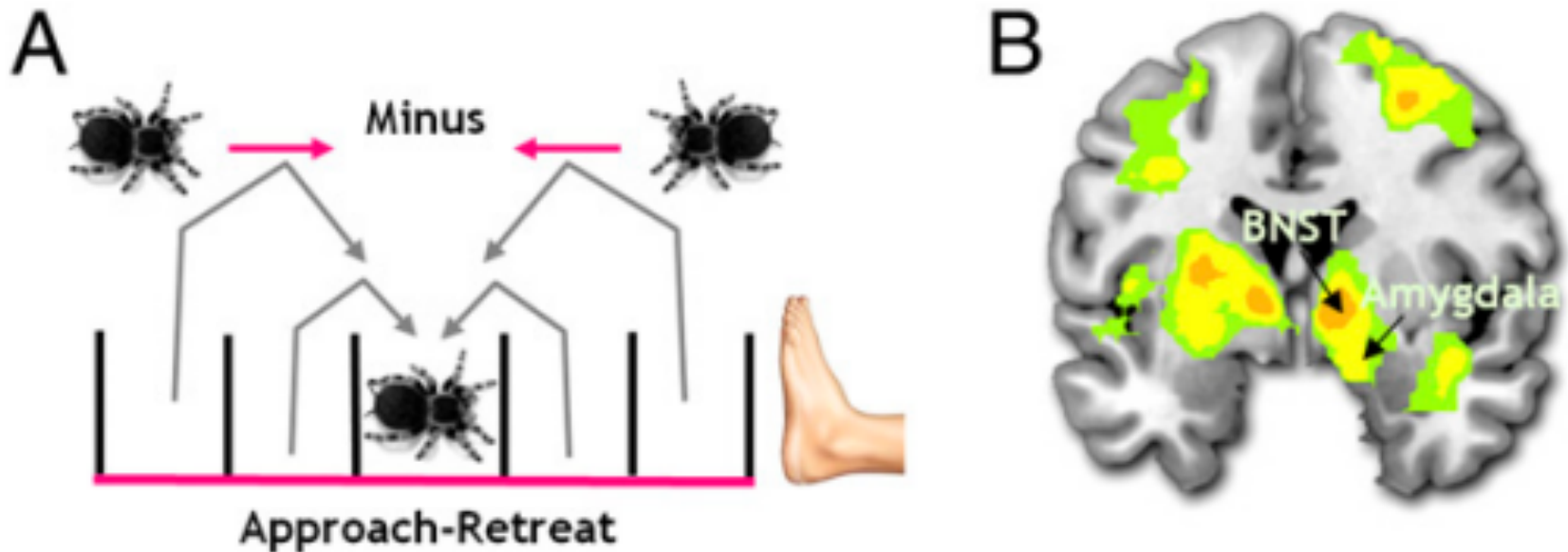


Kalin, Shelton, Fox, Rogers, Oakes and Davidson (2008)



# Emerging evidence of BST involvement in human anxiety studies

BST is differentially active when a spider is retreating vs. approaching the participant

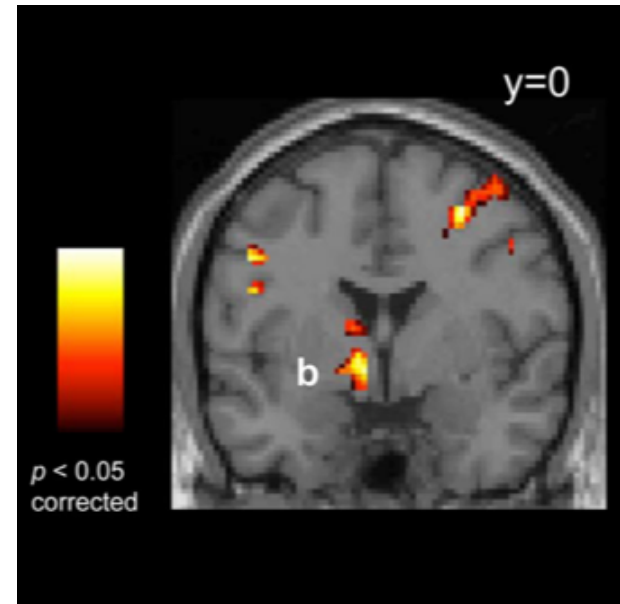
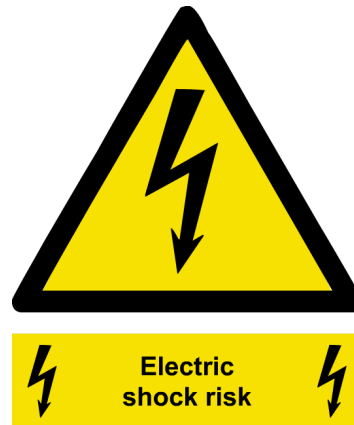
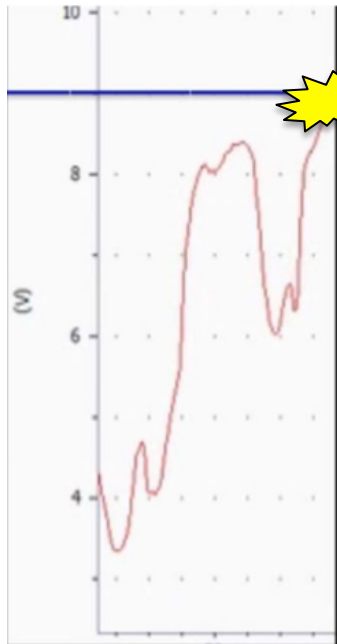


Mobbs, Yu, Rowe, Eich, FeldmanHall and Dalgleish (2010)



# Emerging evidence of BST involvement in human anxiety studies

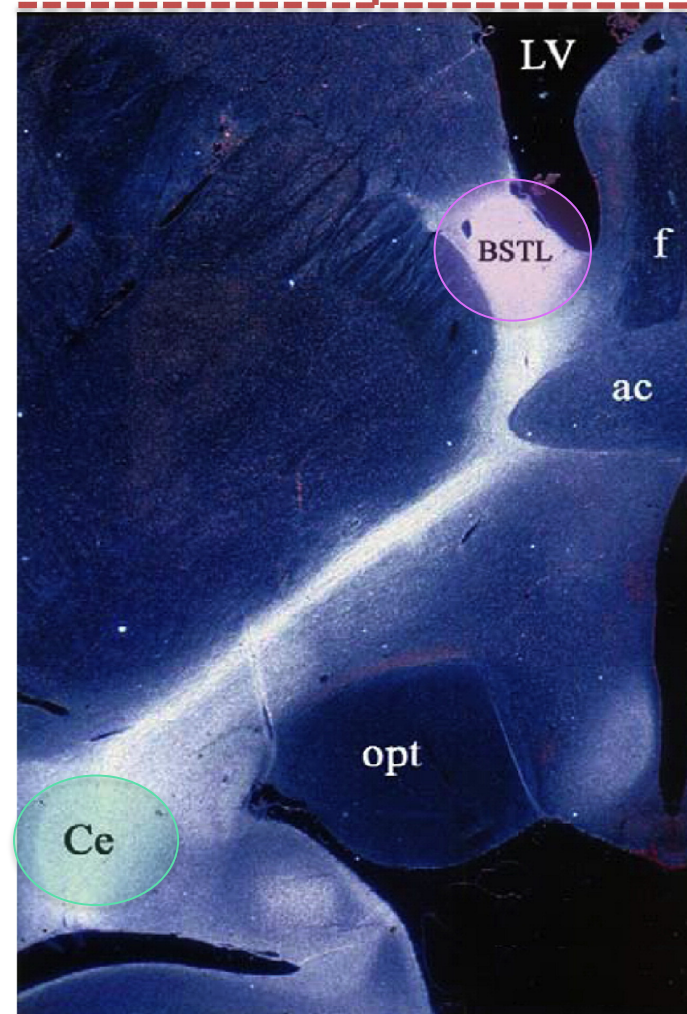
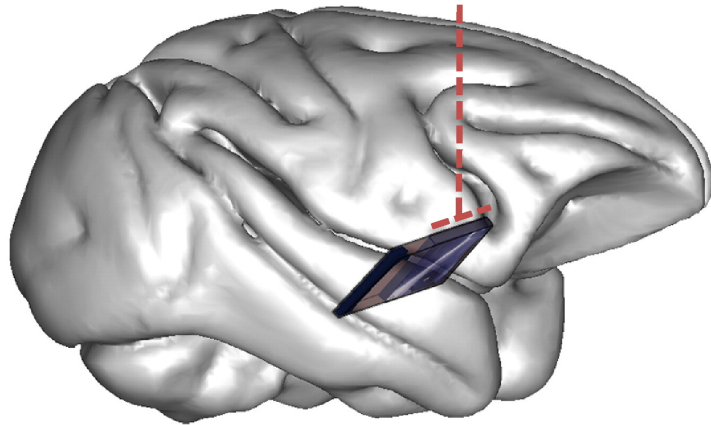
BST is implicated in hyper vigilant threat monitoring in anxious subjects





Somerville, Whalen and Kelley (2010)



# Anatomical evidence for connectivity of the Ce and BST in non-human primates

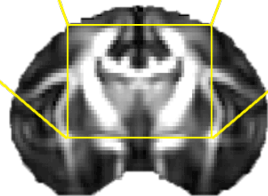
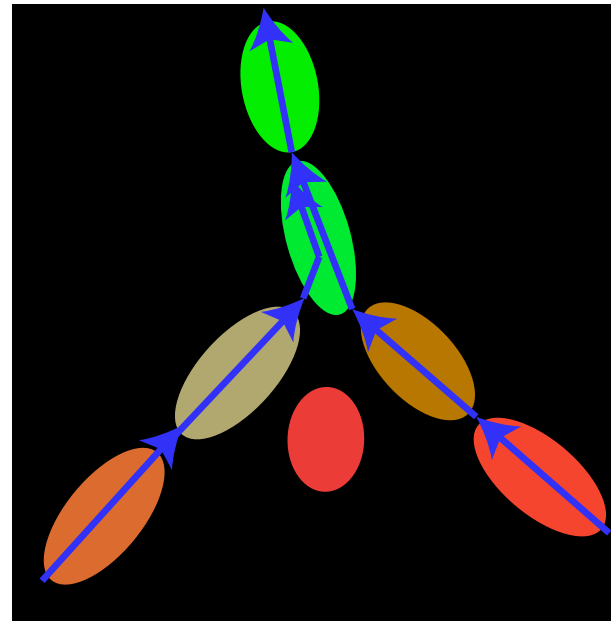
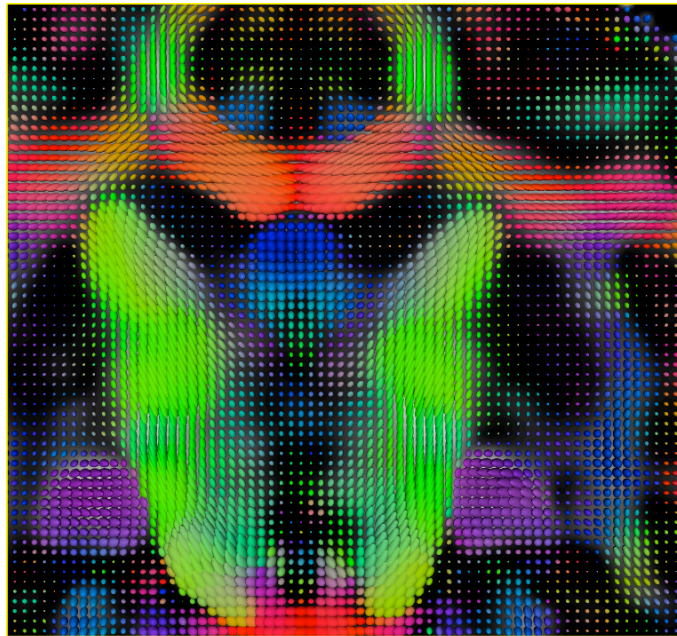


-  Central nucleus of amygdala (Ce)
-  Bed nucleus of stria terminalis (BST)

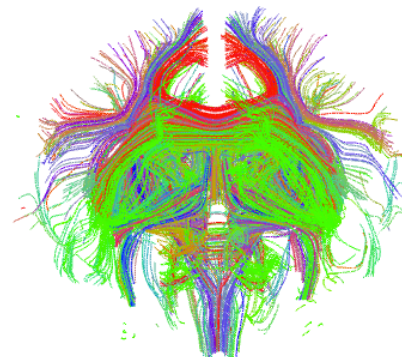
Heimer & Van Hoesen (2006)



# Diffusion tensor imaging (DTI) of the extended amygdala



Fractional anisotropy (FA) map  
from tensor image

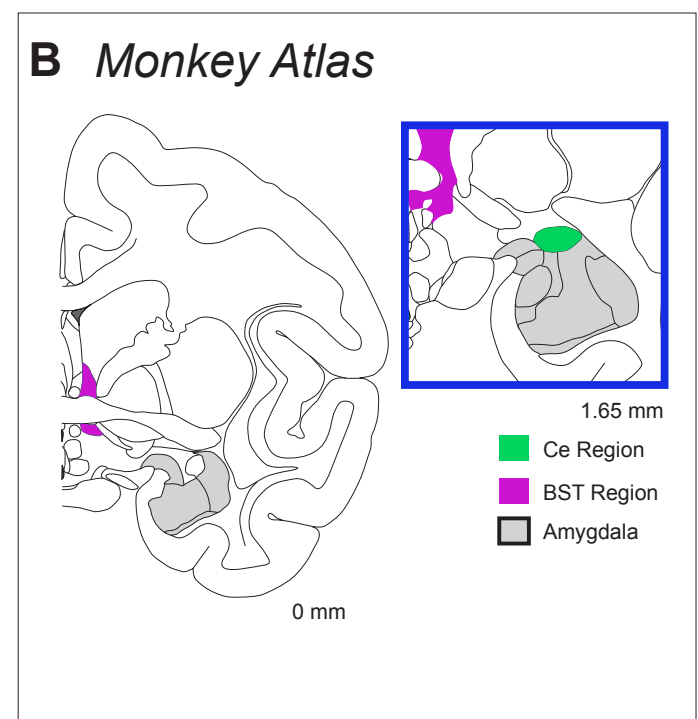
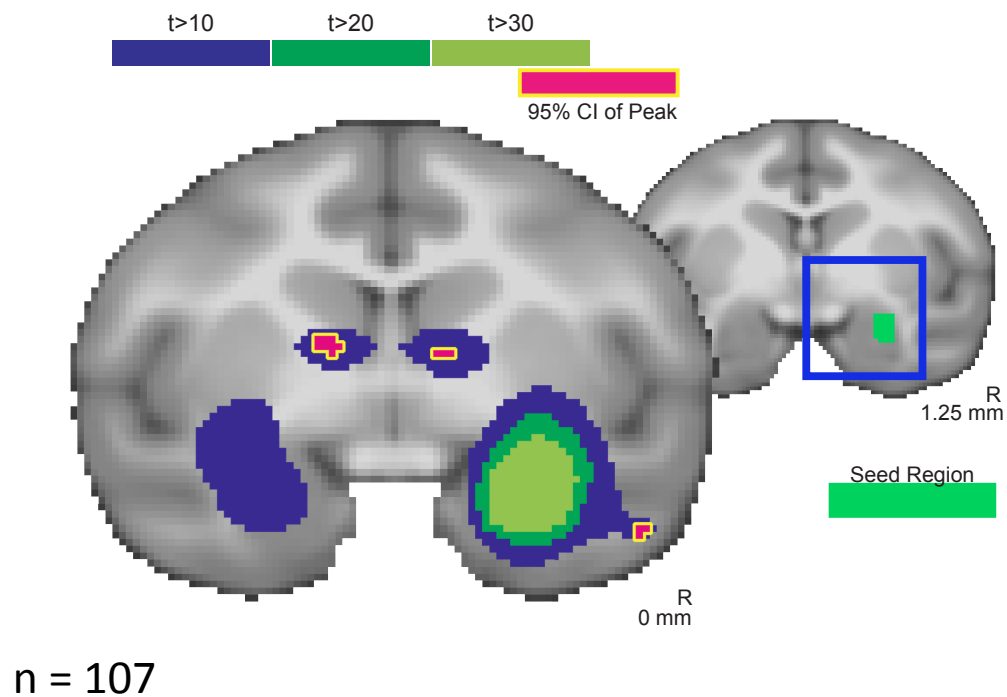


Fiber tractography





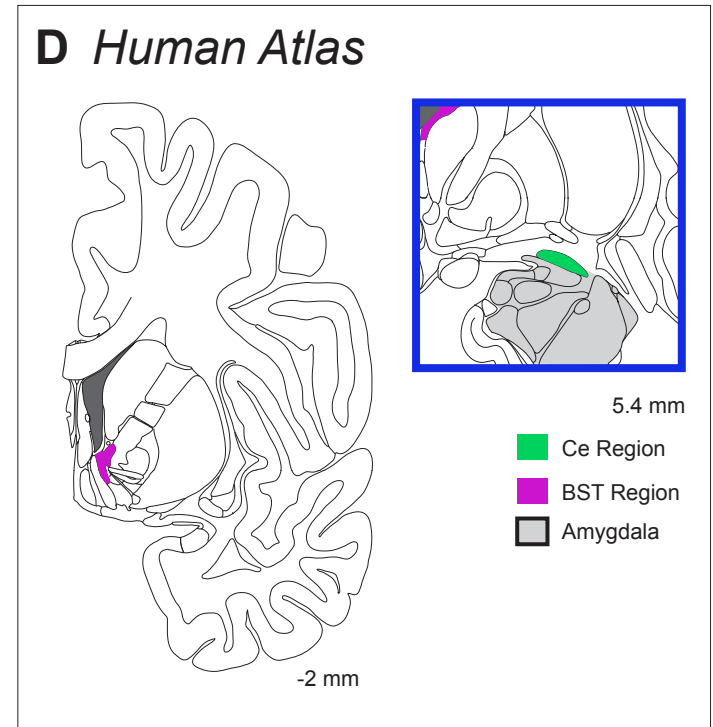
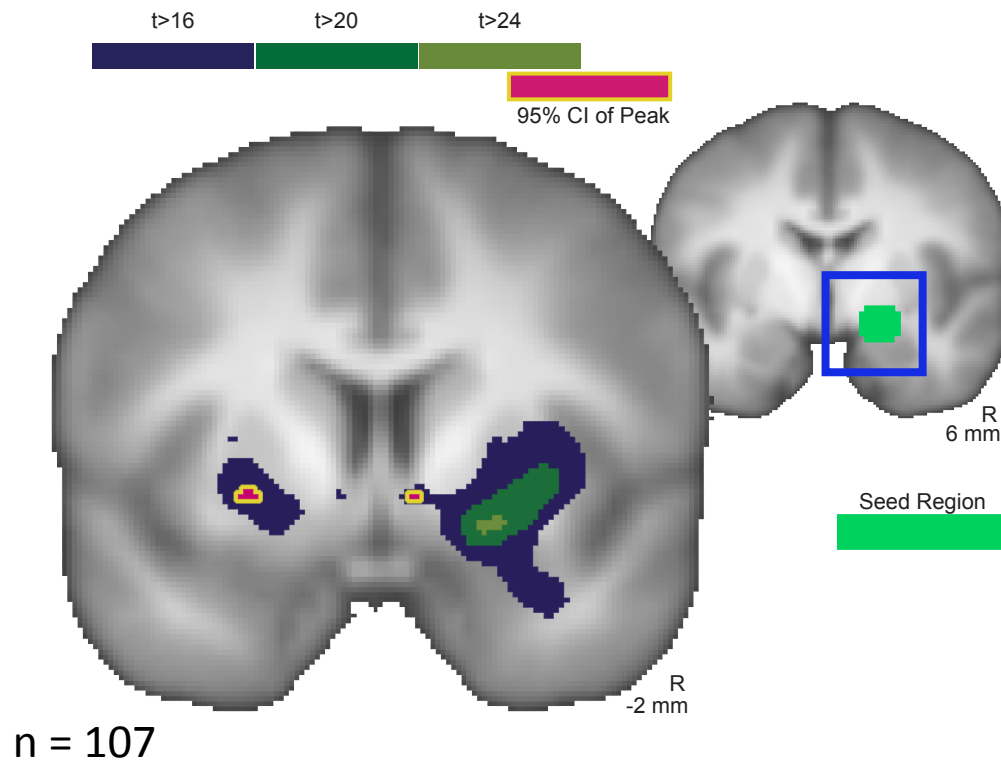
# Ce is functionally connected to the BST in non-human primates



Oler, Birn, Patriat, Fox *et al.* (2012)



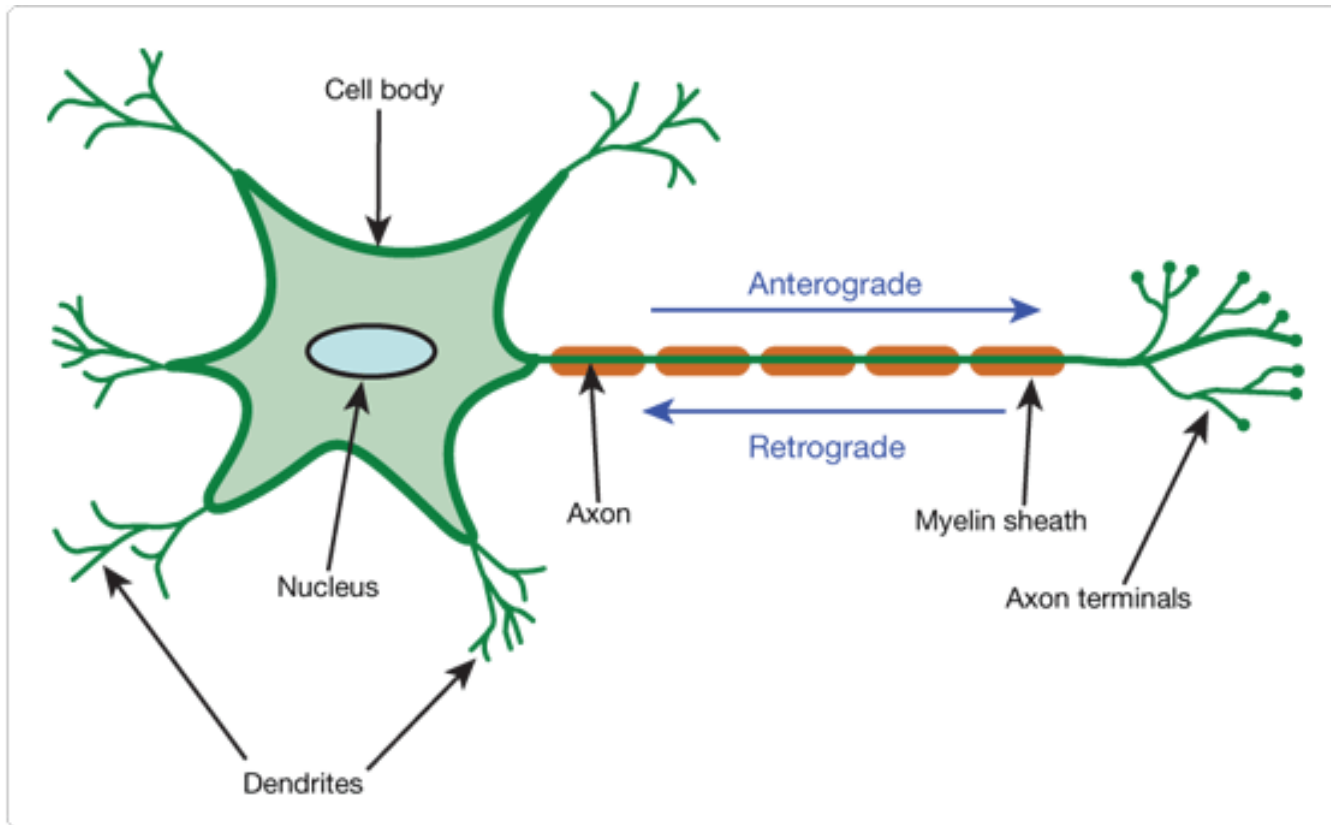
# Ce is functionally connected to the BST in humans



Oler, Birn, Patriat, Fox *et al.* (2012)



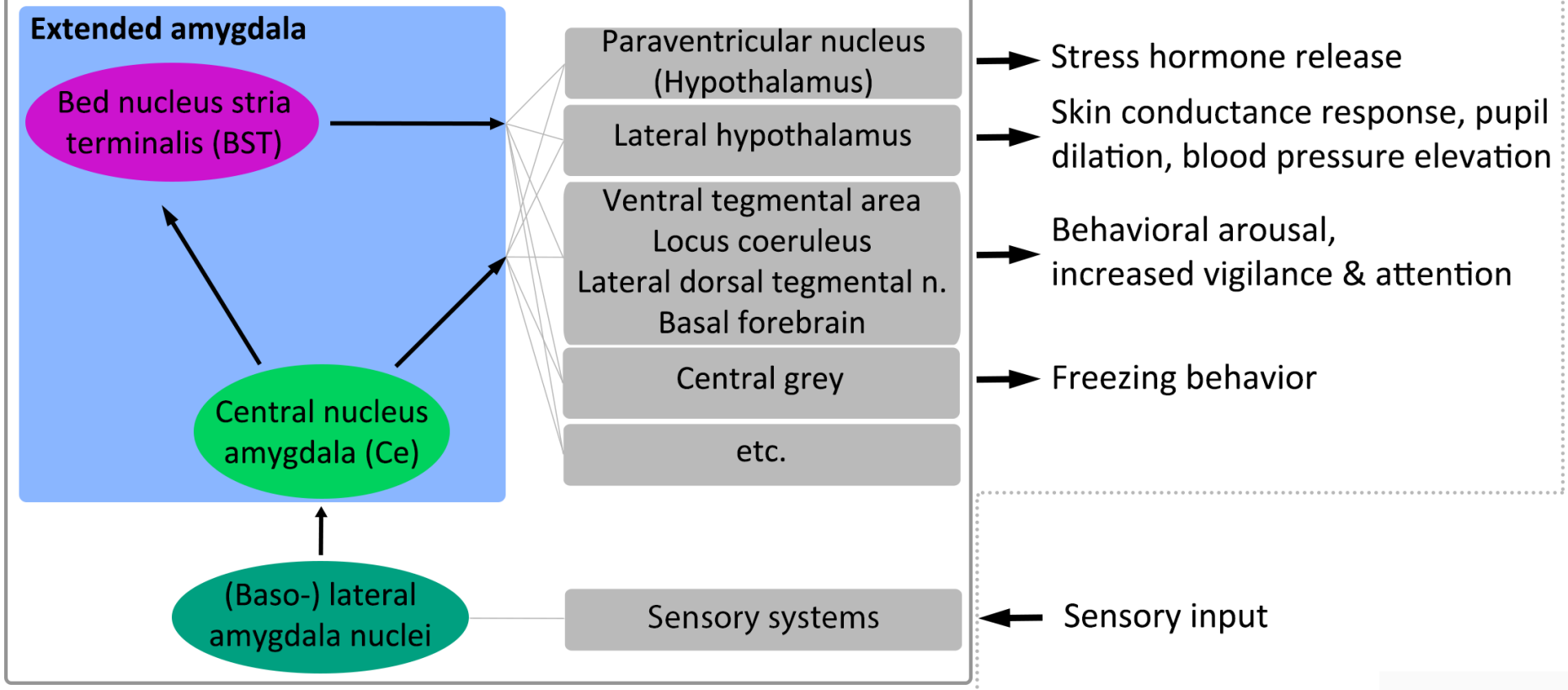
# Using tracer studies to study directionality



# Mapping connectivity in anxiety

## Behavior and peripheral stress response

### Brain



Adapted from Davis & Whalen (2001)



# HEALTHEmotions

RESEARCH INSTITUTE  
UNIVERSITY OF WISCONSIN



Andy Alexander



Pat Roseboom



Nagesh Adluru

Helen Van Valkenberg  
Marissa Riedel  
Jenny Storey  
Steve Nanda  
Ben Berg



Steve Shelton



Alex Shackman



Brad Christian



Richie Davidson



Jonathan Oler



Alex Converse



Ned Kalin



Andrew Fox



Rasmus Birn



Julie Fudge



Danielle de Campo

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