Class 6

October 26, 2013

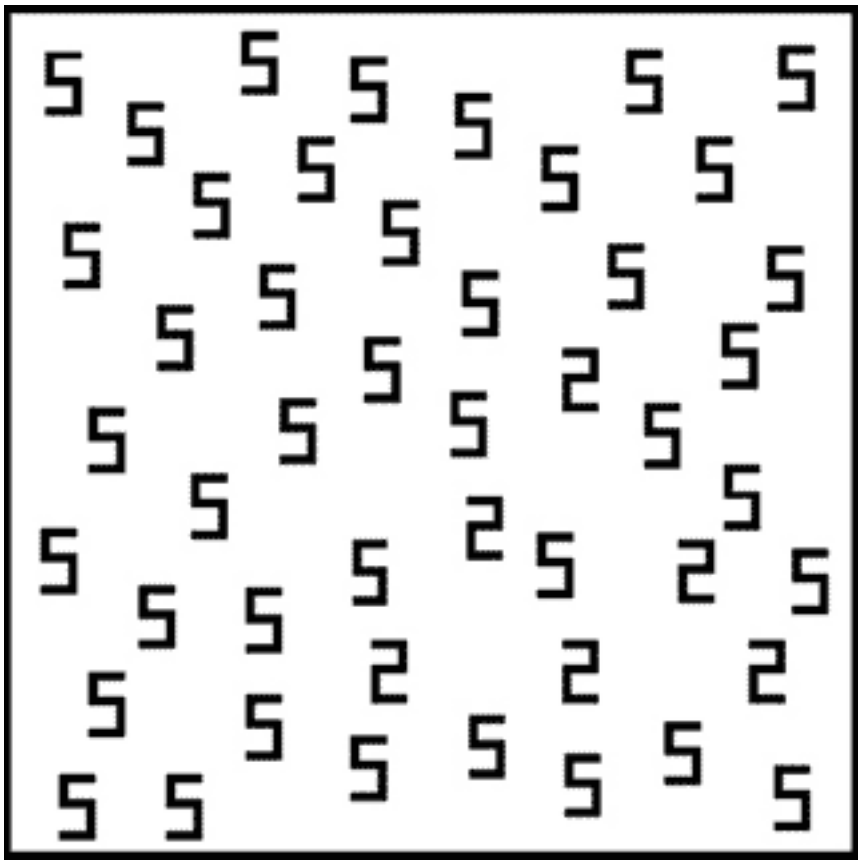
Synesthesia

From Greek:

syn = together and *aisthesis* = perception

Types of synesthesia

Grapheme color



Other types of synesthesia

Sound color: common in musicians and composers

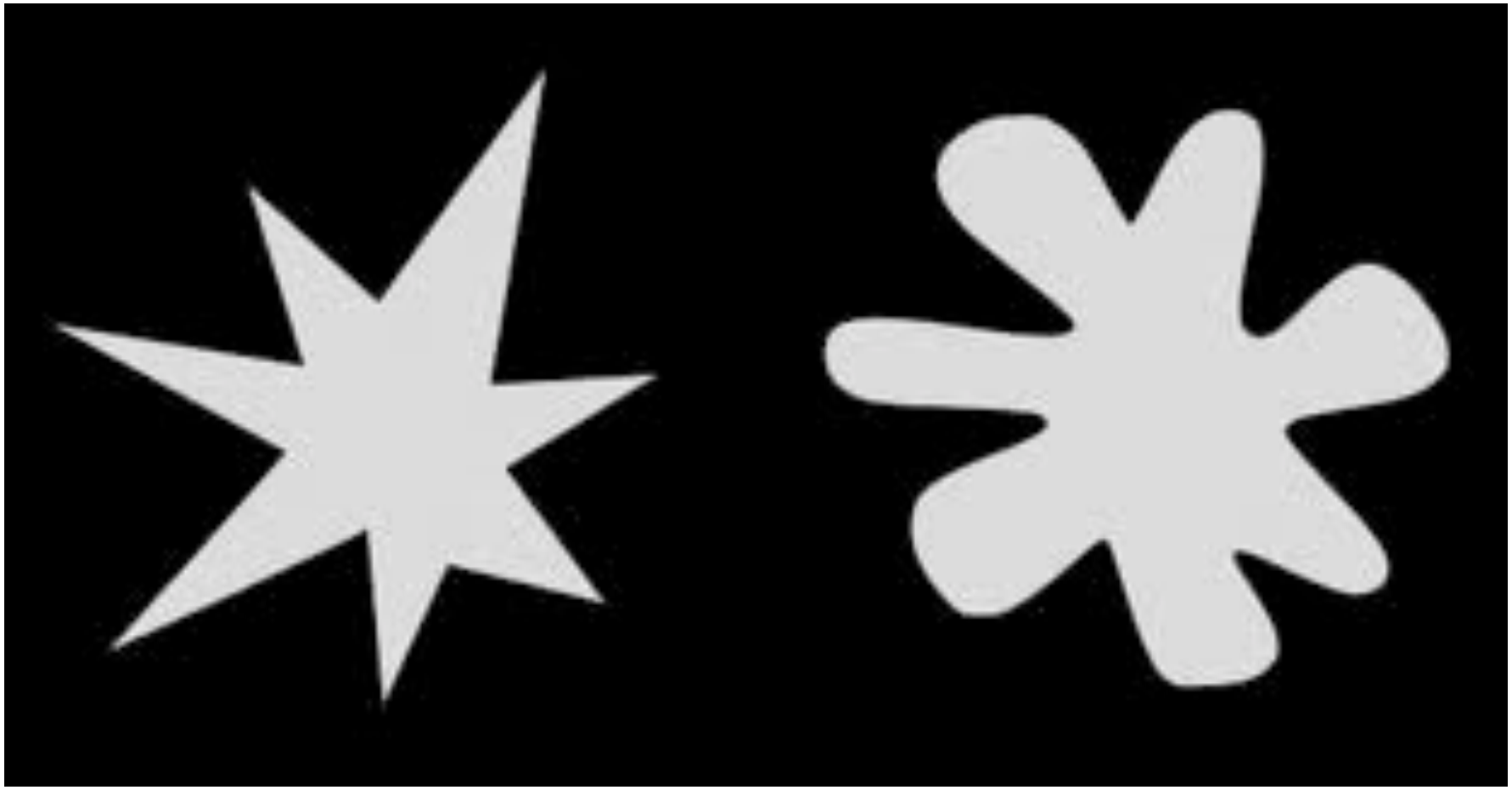
Ordinal linguistic personification

Lexical gustatory

One example

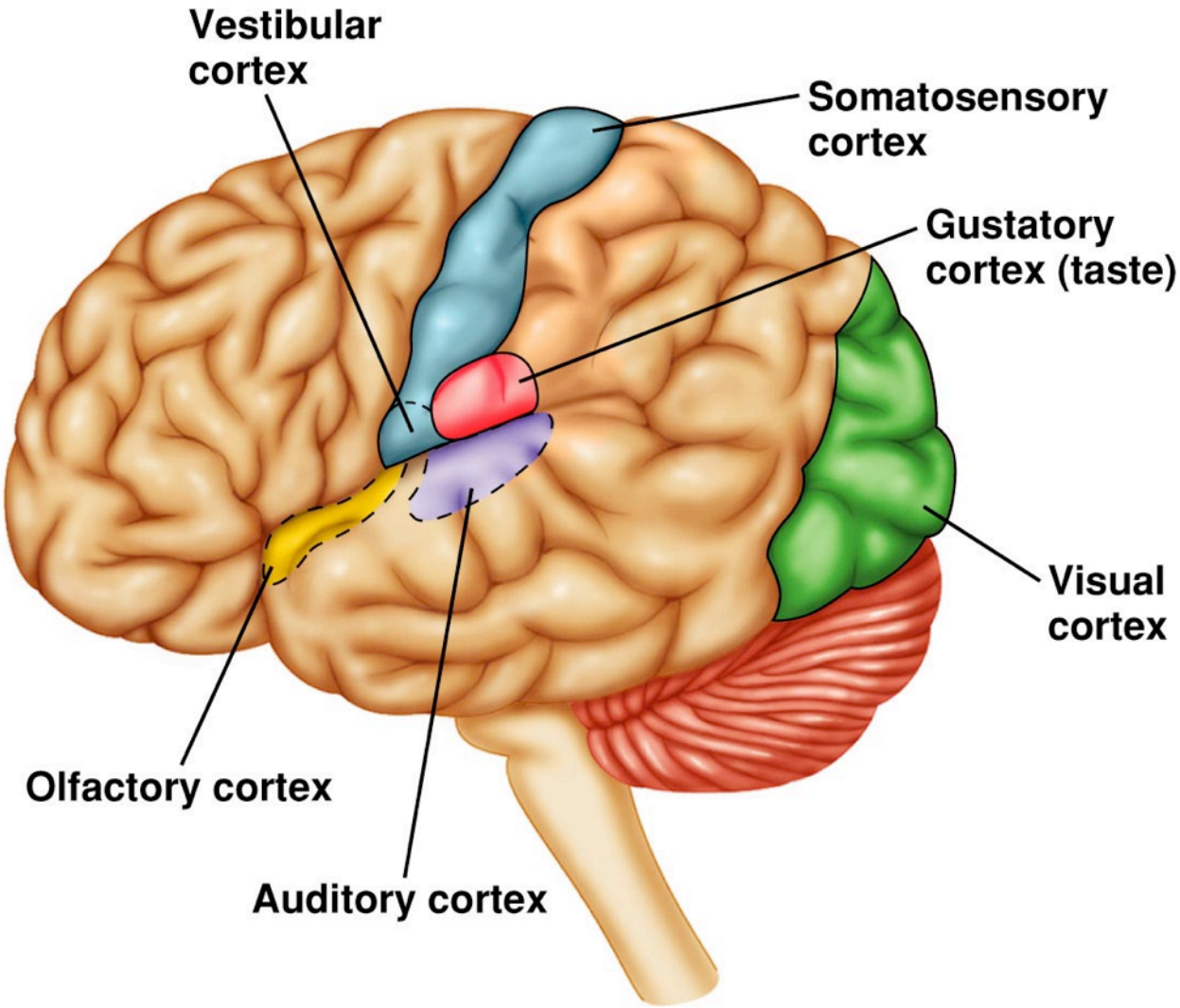
Number	Color	Personality
1	Black	Very stout, a firm character. I often see him wearing a polka-dotted bowtie.
2	Royal blue	Very stable in character. He is a natural leader and very intelligent.
3	Rusty orange	NA
4	Scarlet red	Very much a lady. She has a very authoritarian attitude and is usually in charge of things.
5	Forest green	Has a very calm demeanor.
6	Bright yellow	She is always in high spirits. 6 is arguably the brightest and happiest of all the digits.
7	Chocolate	Oddball. He is also constantly unbalanced, frequently seen tripping over things as he walks. I think he has scoliosis.
8	Beige	8 is very showy and classy. Her jewel of choice is the pearl, as she is always wearing pearl necklaces and rings. She is also frequently seen wearing knee-length dresses and high-heeled shoes.

We all have some form of this



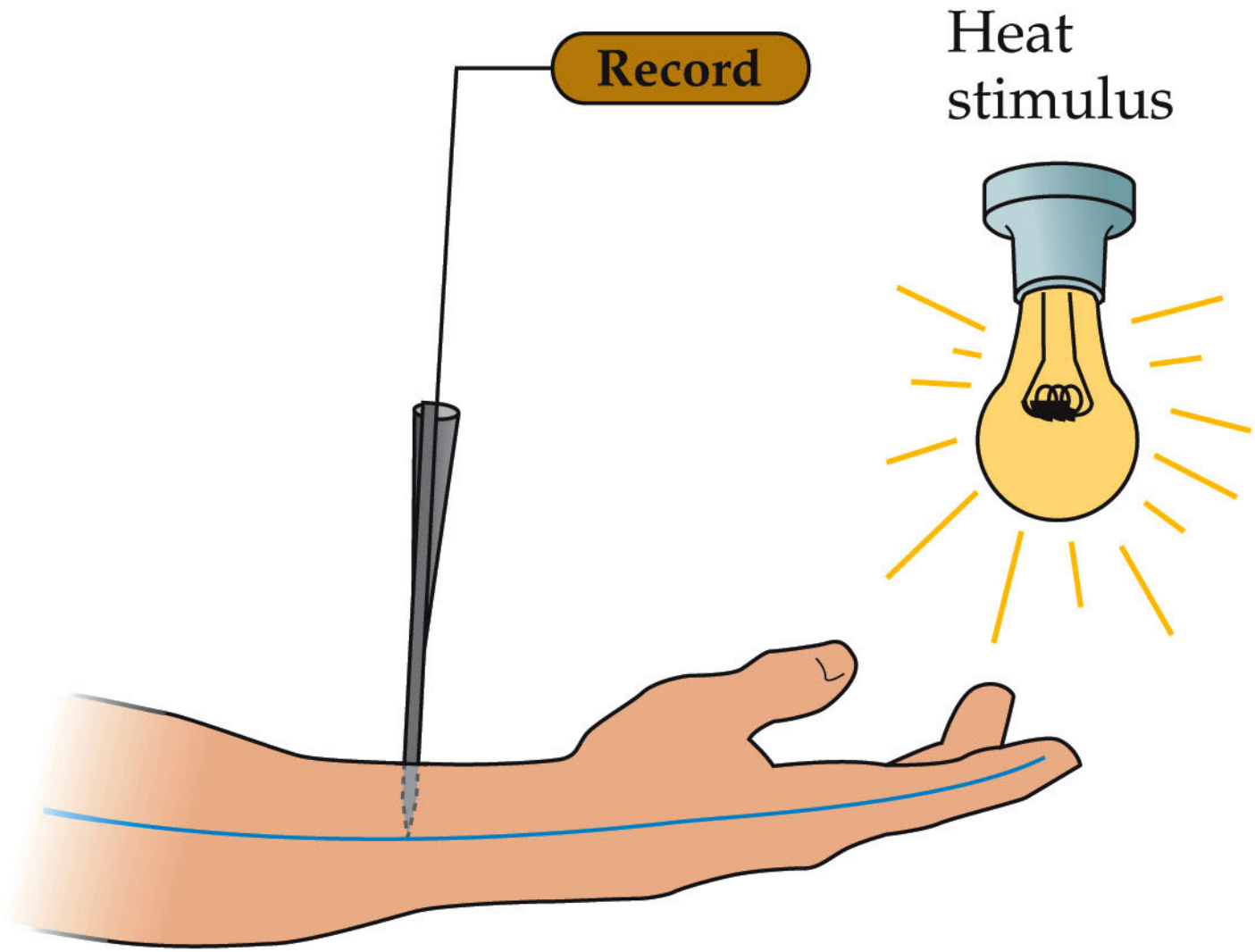
Which one of these shapes is called Kiki and which one is called Bouba?

The neuroscience of synesthesia



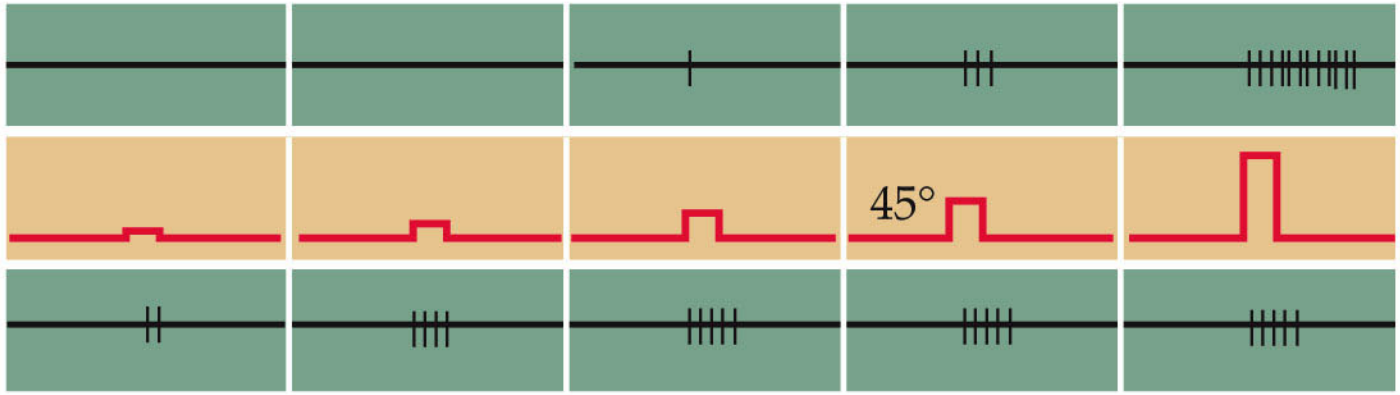
Pain!

(A)

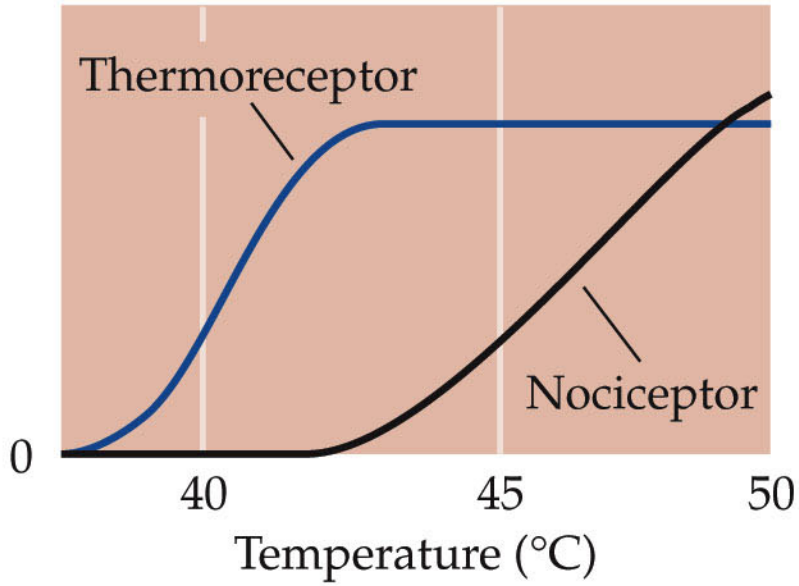


***NEUROSCIENCE, Fourth Edition,* Figure 10.1 (Part 1)**

(B)

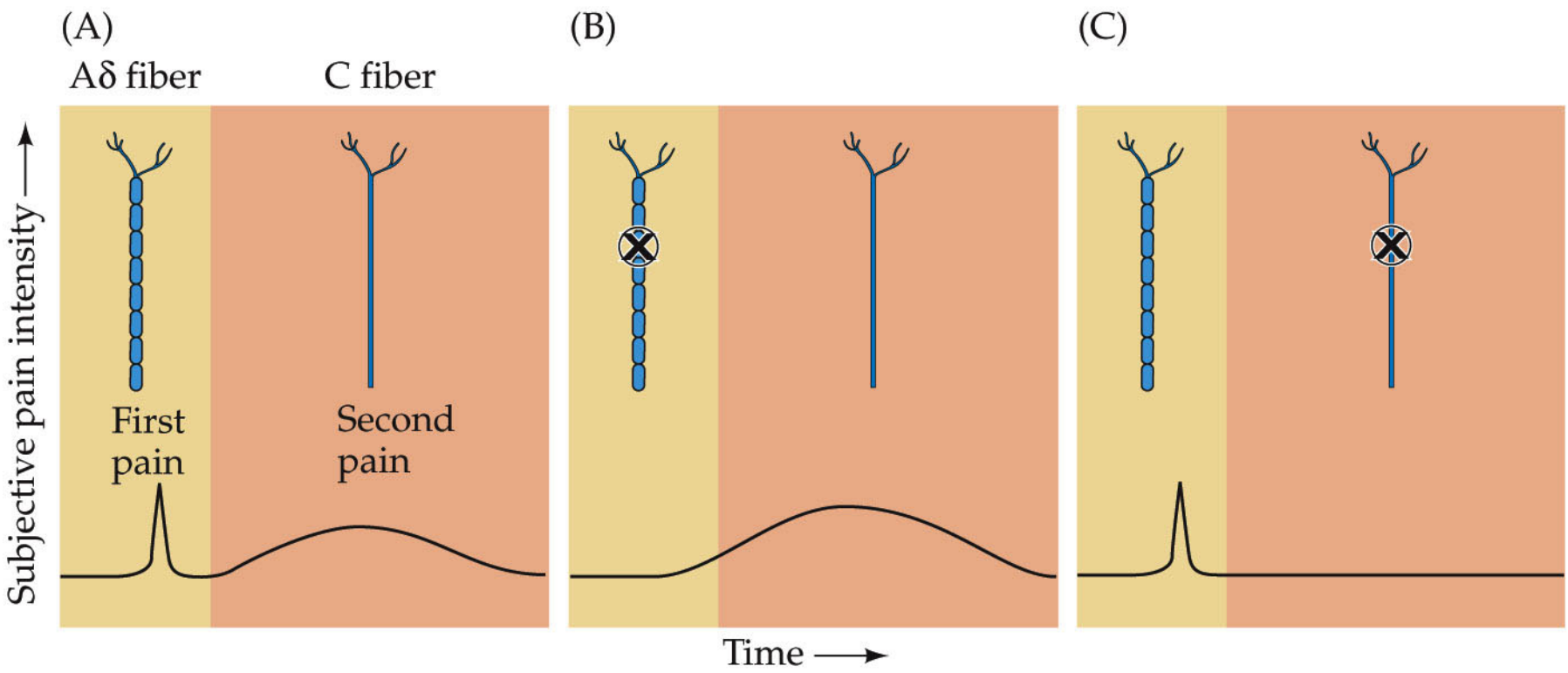


(C)

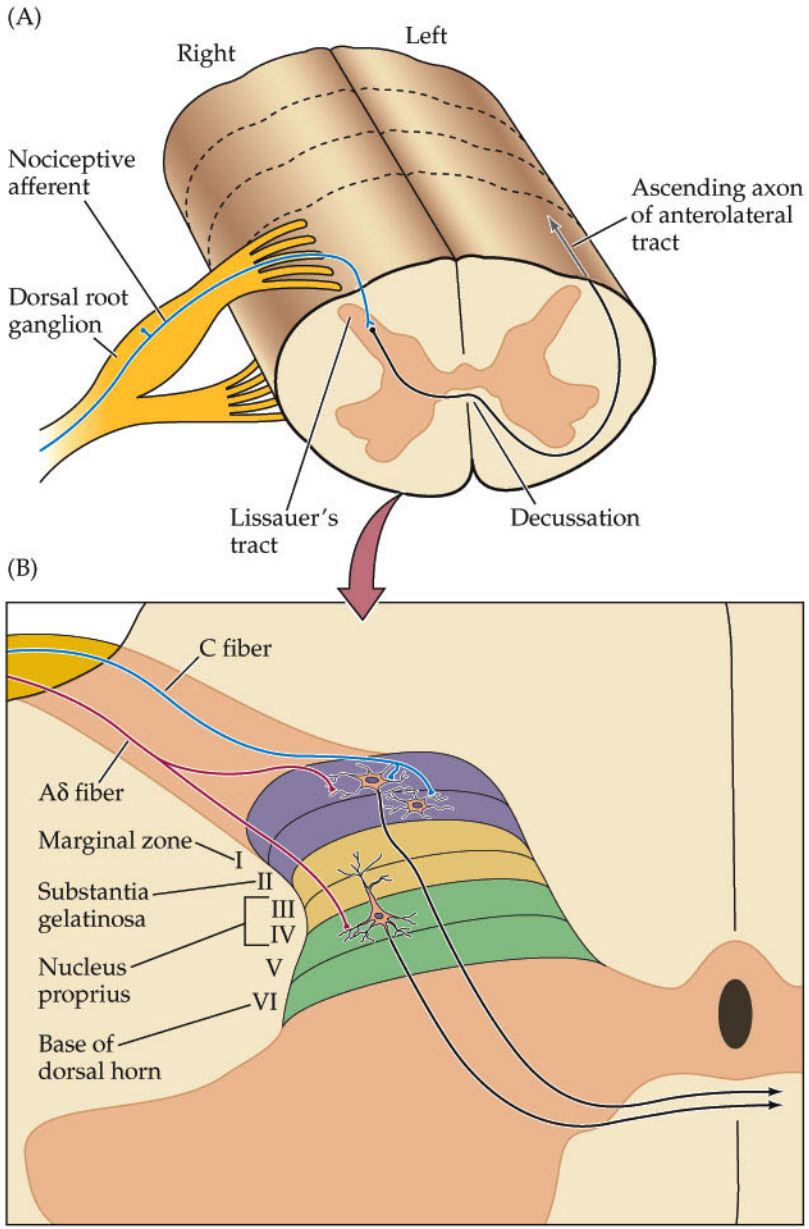


***NEUROSCIENCE, Fourth Edition,* Figure 10.1 (Part 2)**

Pain can be separated into first (sharp) and second (duller, burning) pain

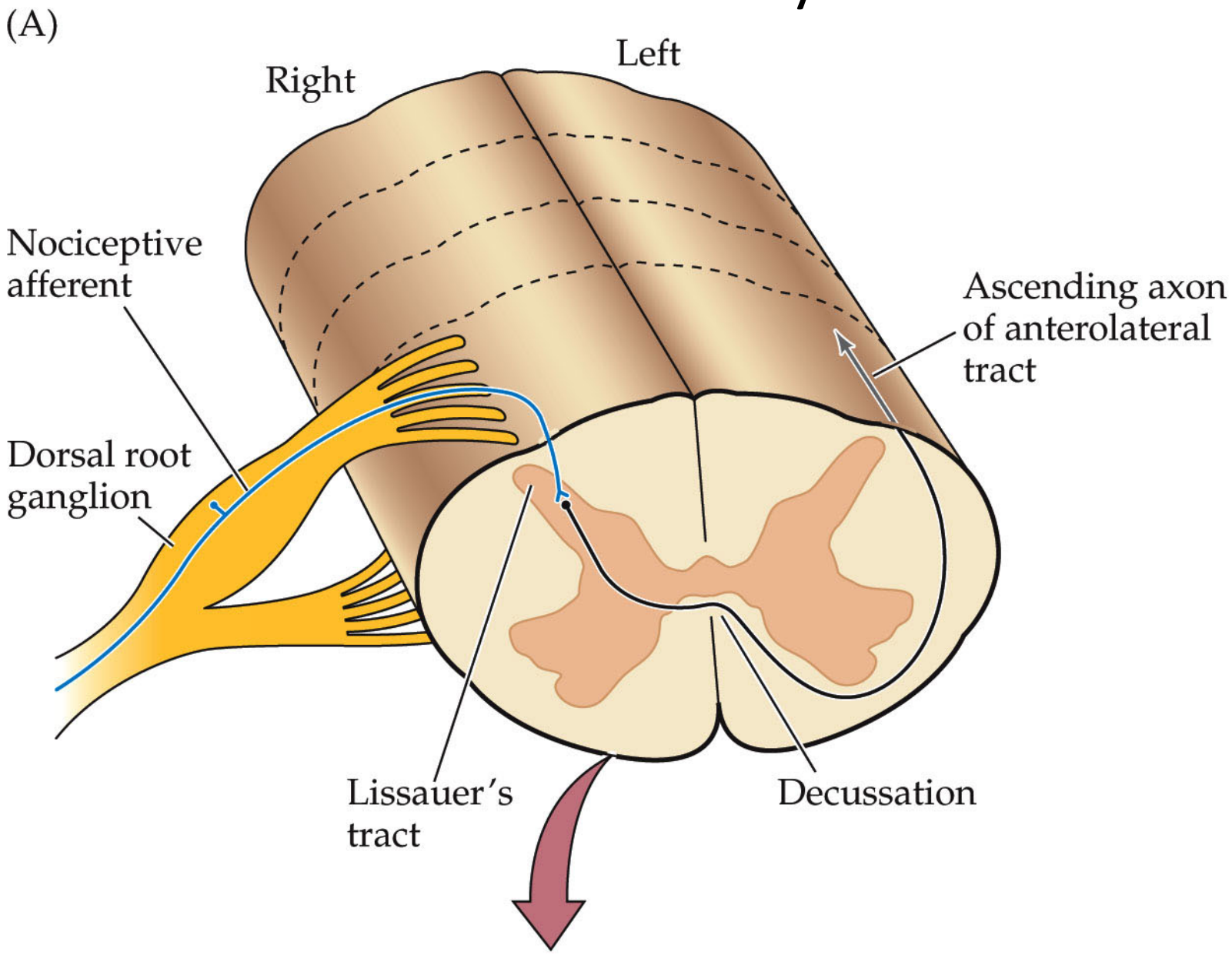


The anterolateral system



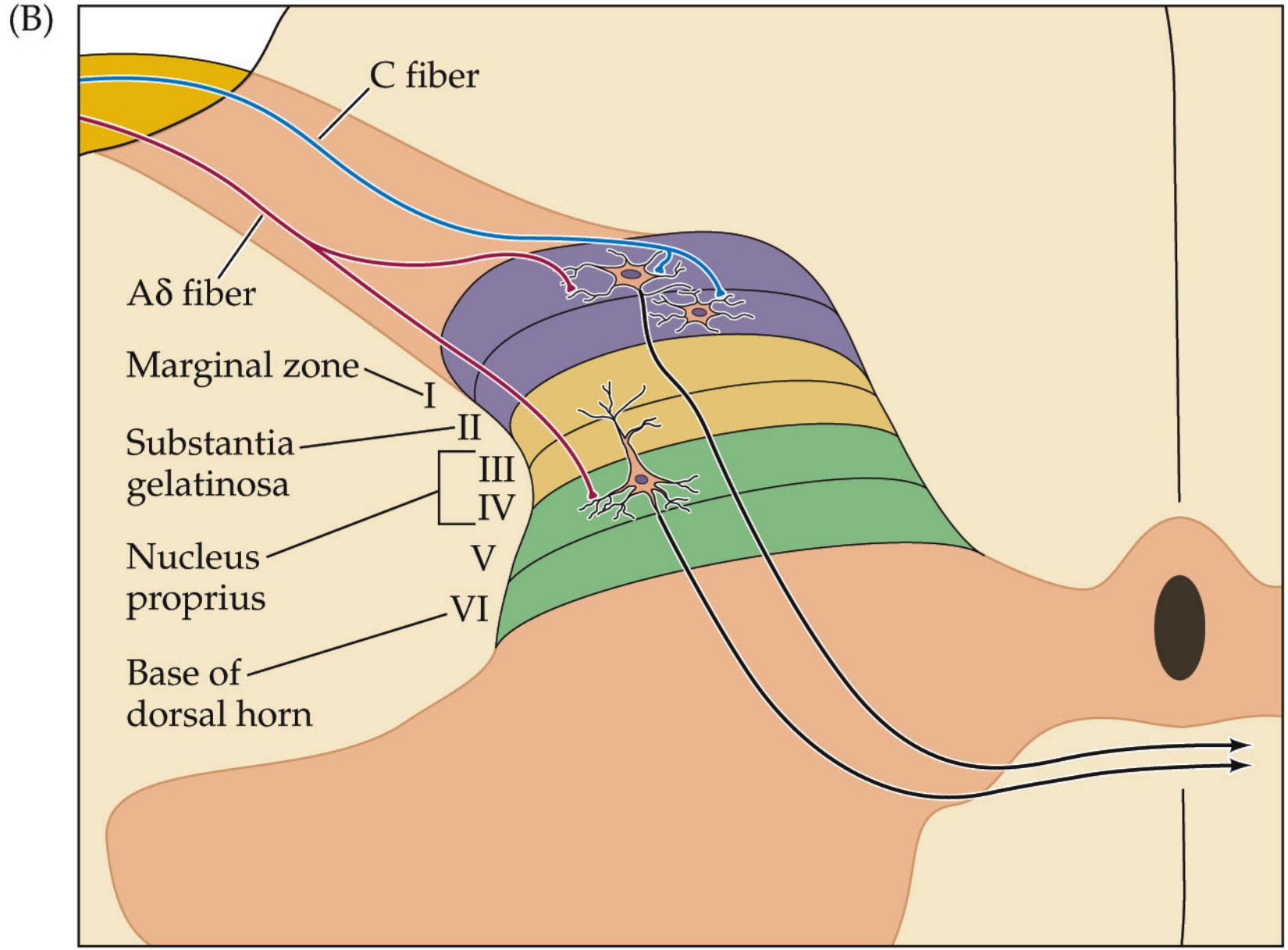
NEUROSCIENCE, Fourth Edition, Figure 10.3

The anterolateral system

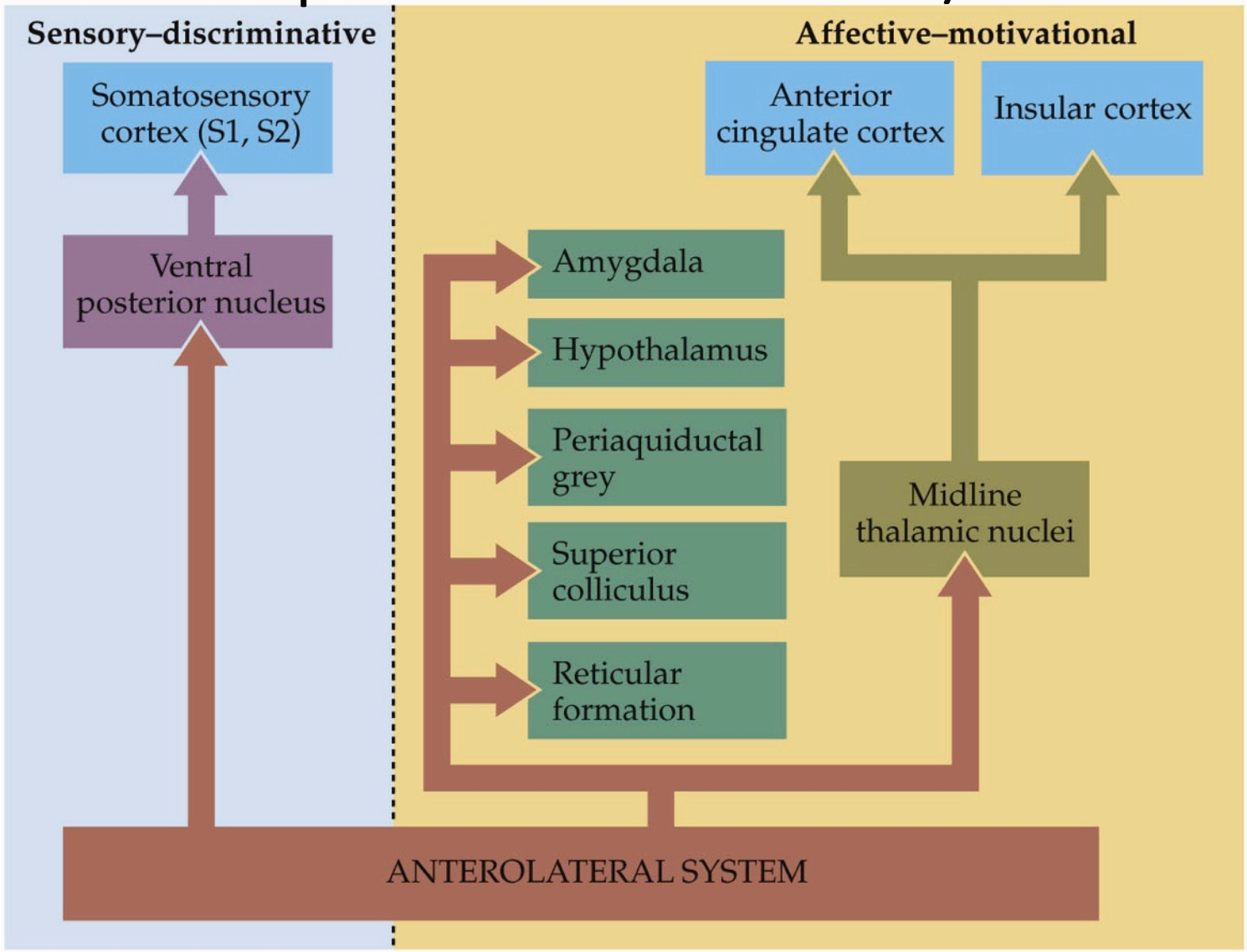


NEUROSCIENCE, Fourth Edition, Figure 10.3 (Part 1)

The anterolateral system

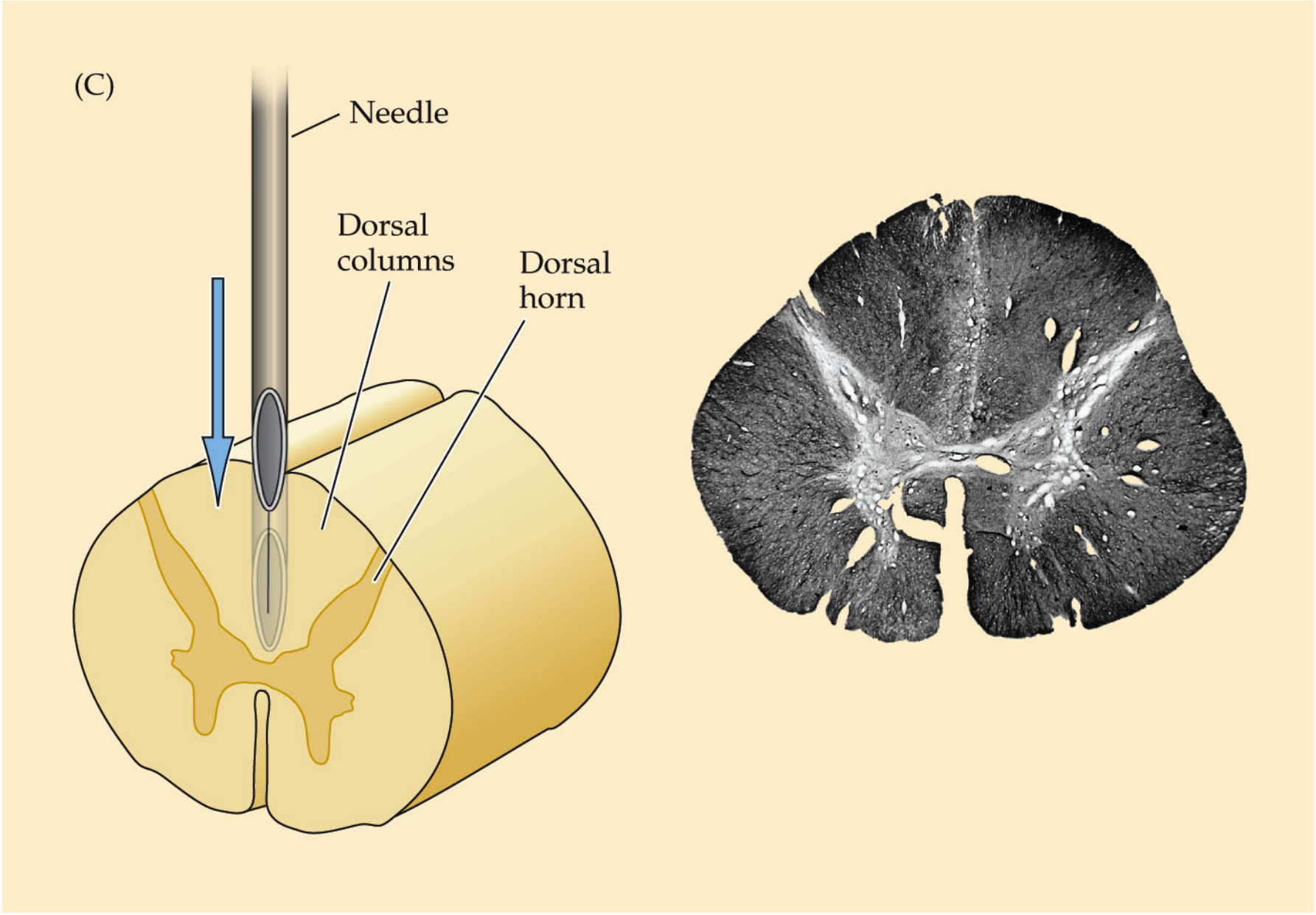


The anterolateral system sends information to different parts of the brainstem/forebrain

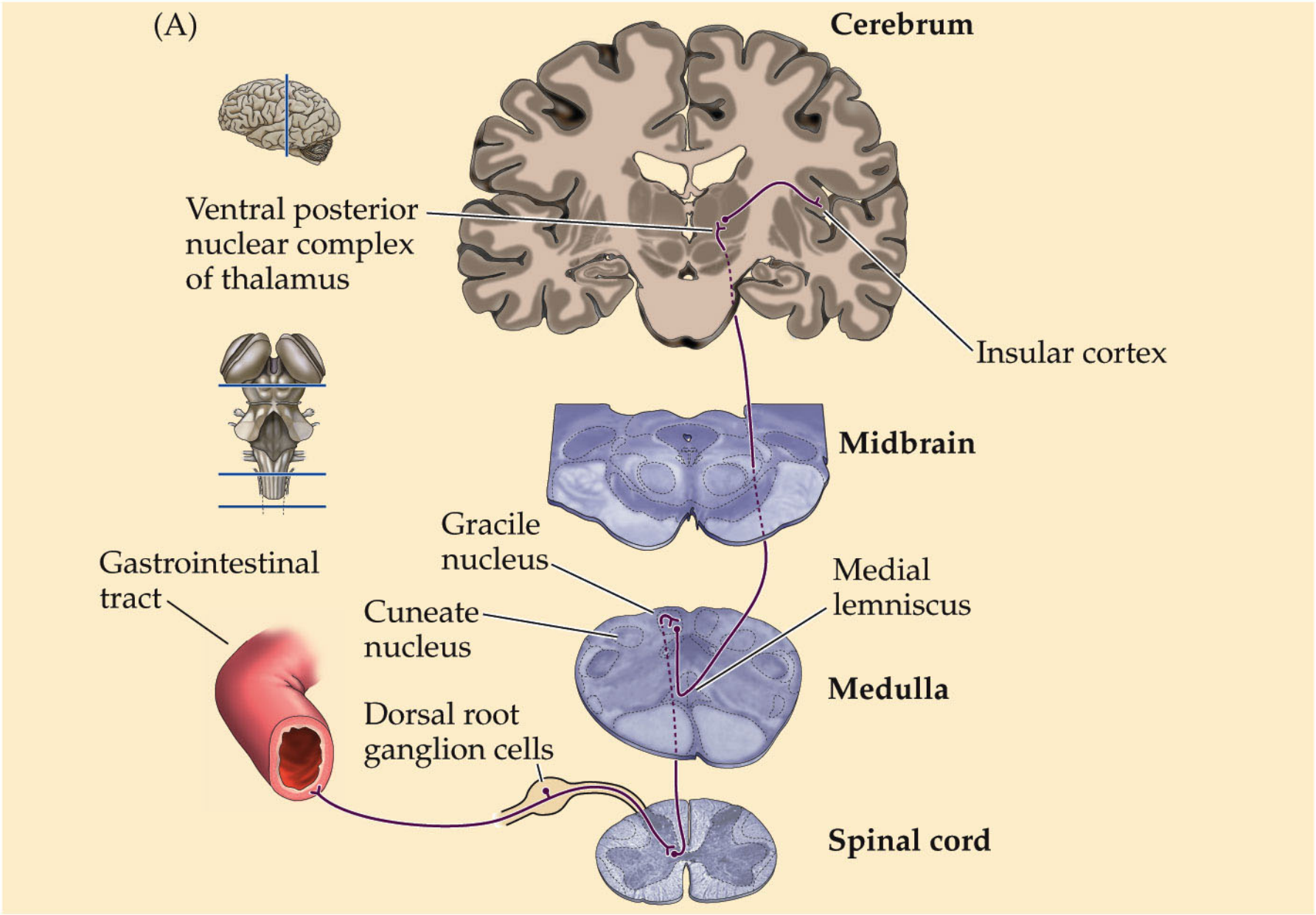


NEUROSCIENCE, Fourth Edition, Figure 10.5

A Dorsal Column Pathway for Visceral Pain

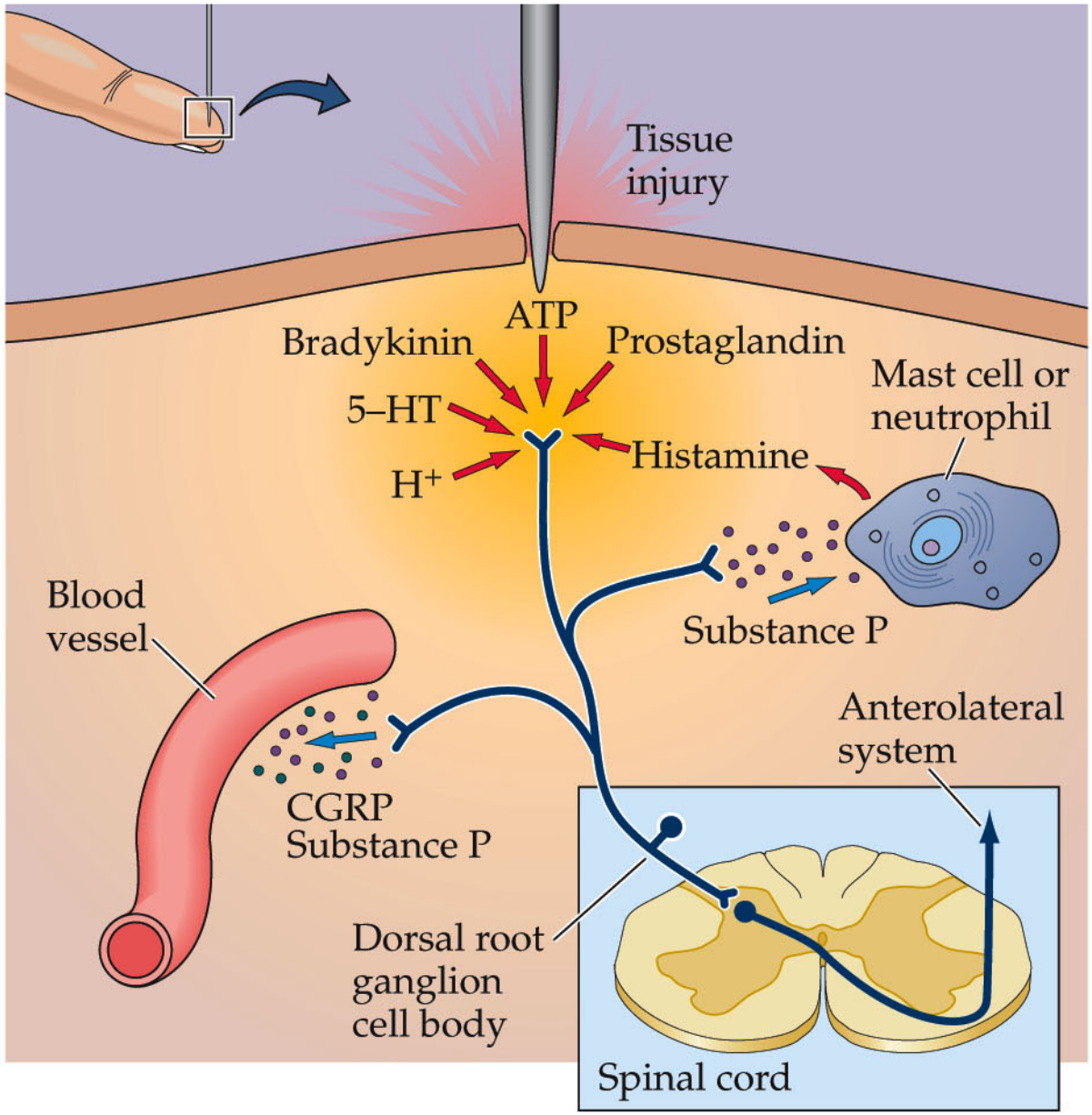


A Dorsal Column Pathway for Visceral Pain

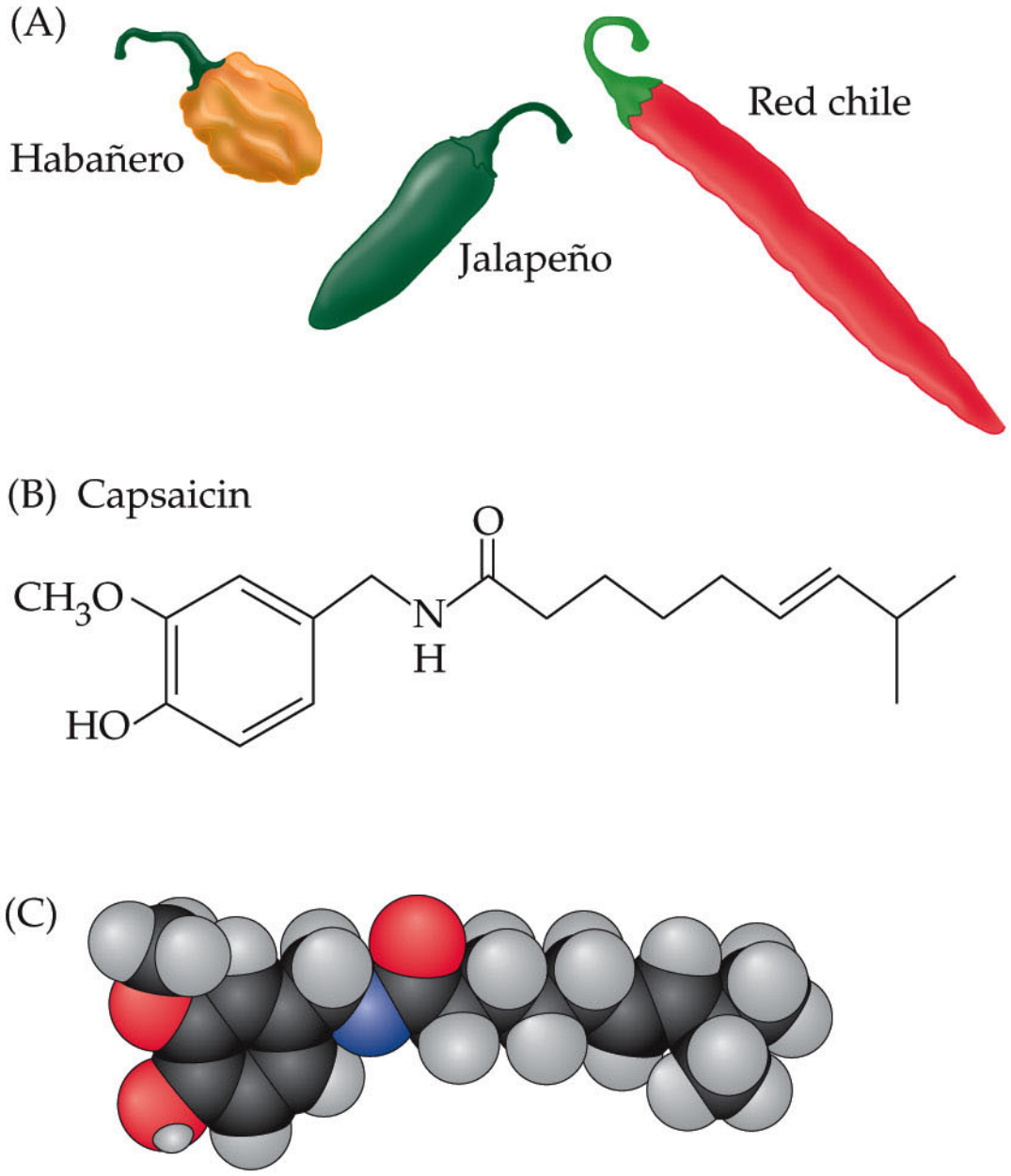


***NEUROSCIENCE, Fourth Edition,* Box 10C (Part 1)**

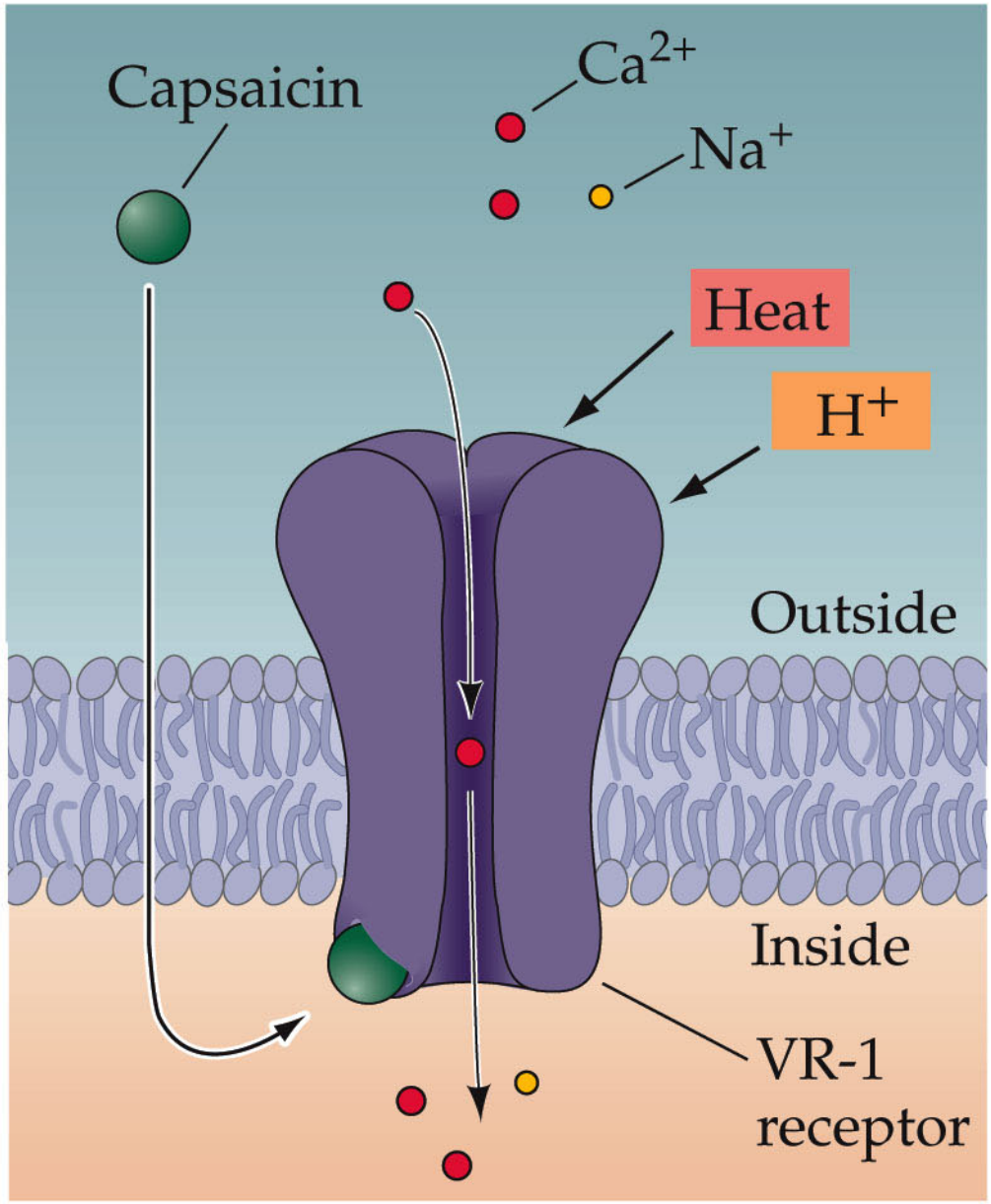
Inflammatory response to tissue damage



Capsaicin



(D)



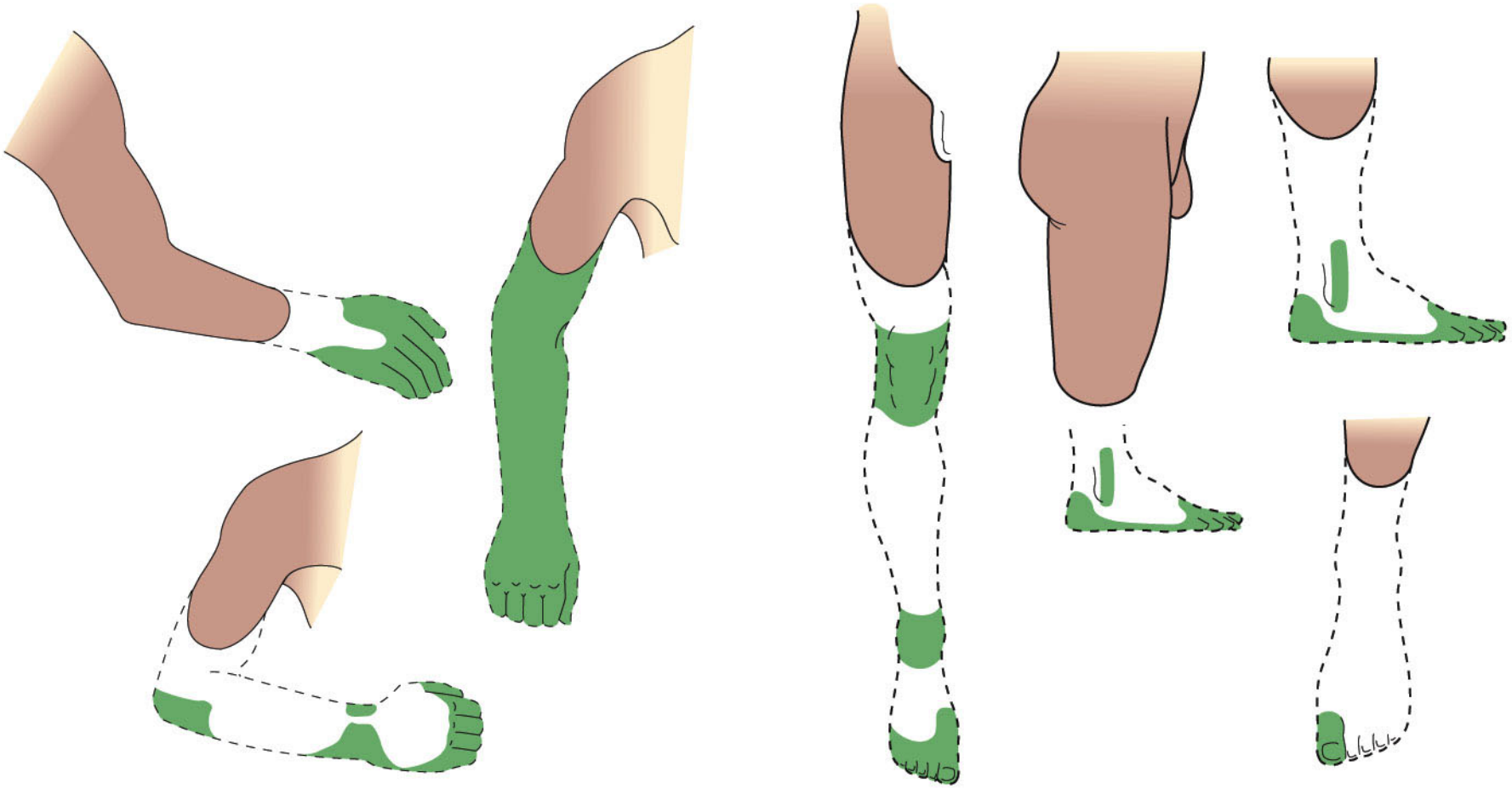
***NEUROSCIENCE, Fourth Edition,* Box 10A (Part 2)**

Using Capsaicin to treat neuropathic pain

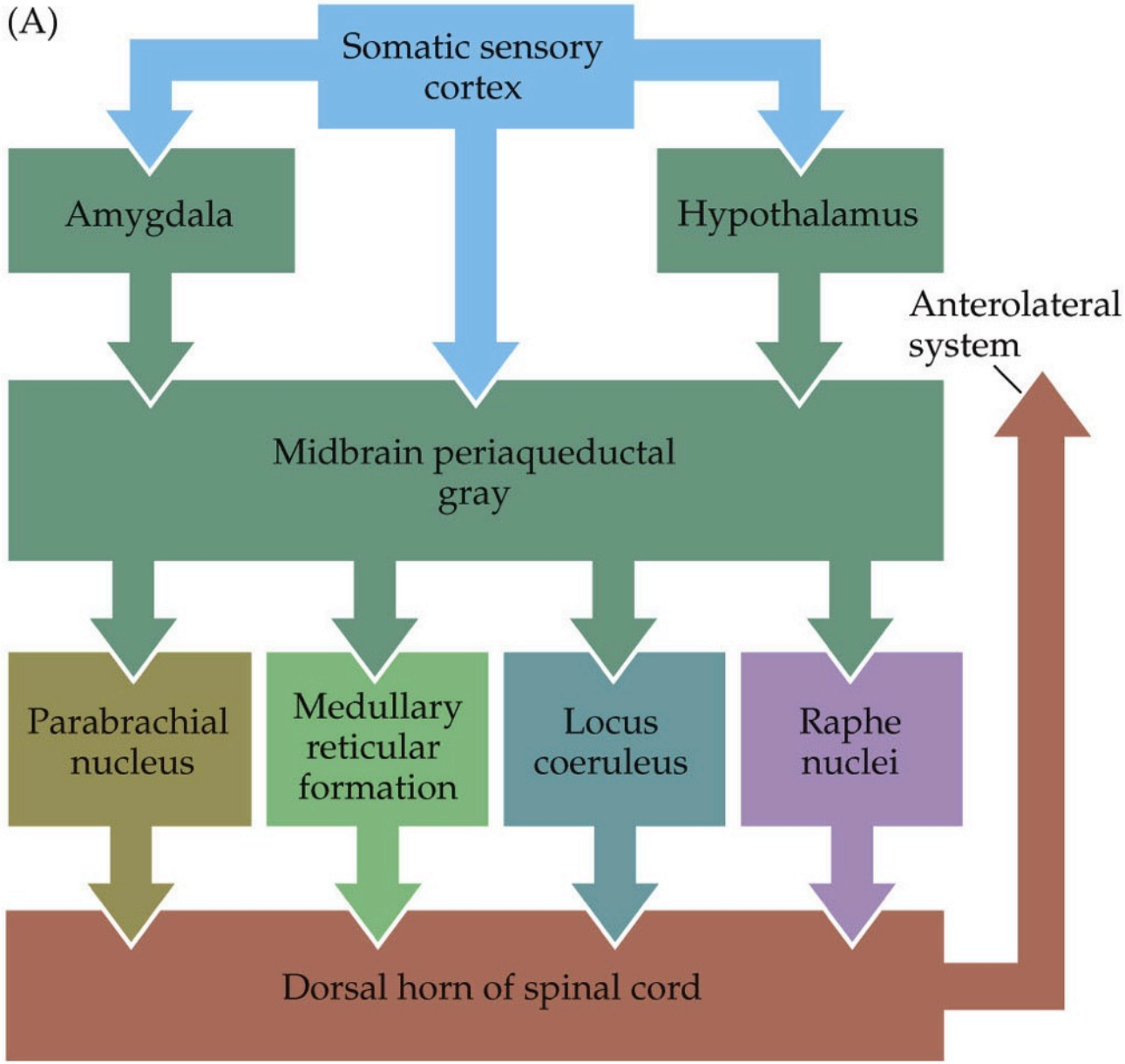
http://abclocal.go.com/wabc/video?id=8819916

Pain: Real or imaginary?

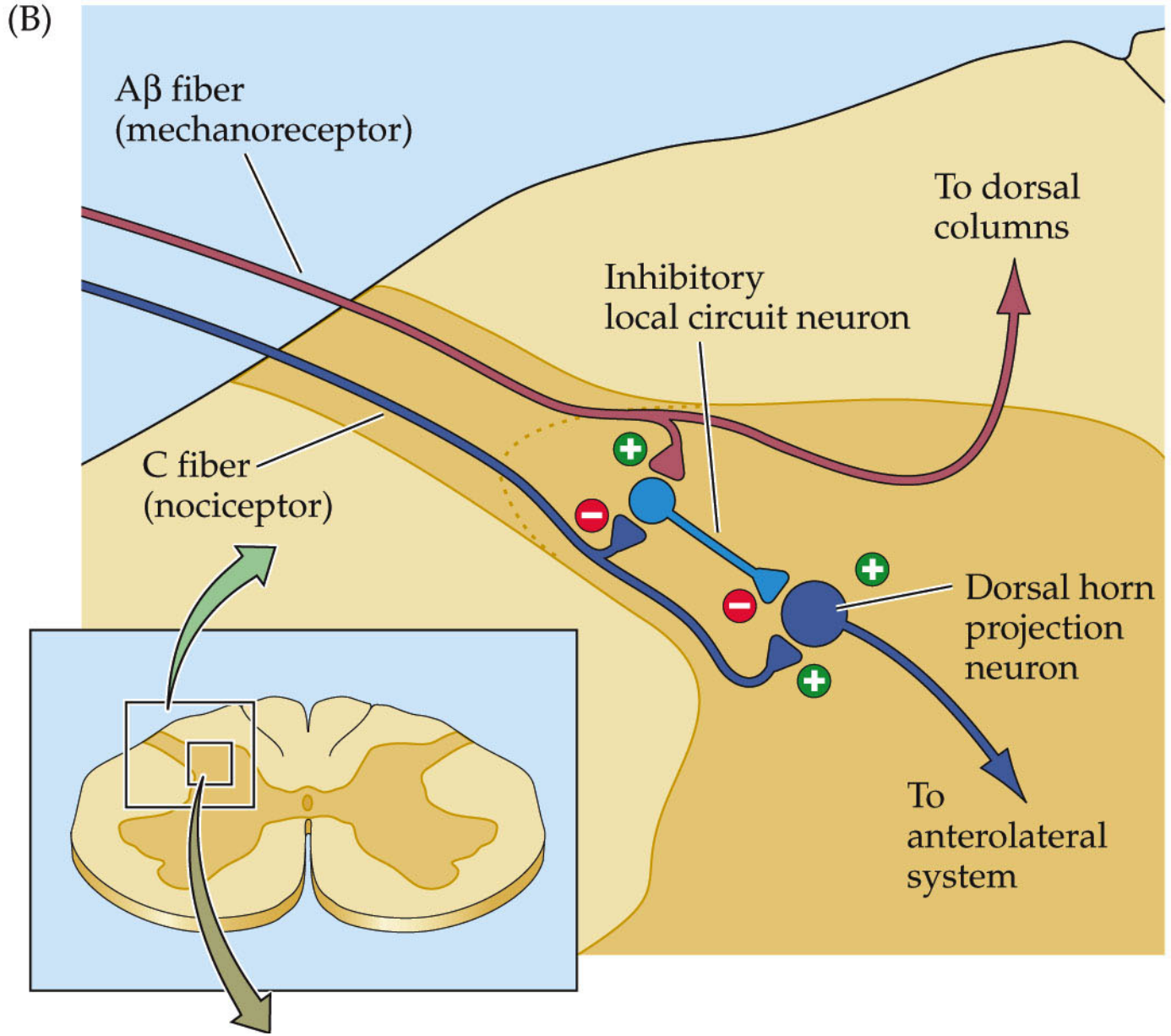
Phantom Limbs and Phantom Pain



Descending systems that modulate the transmission of ascending pain signals

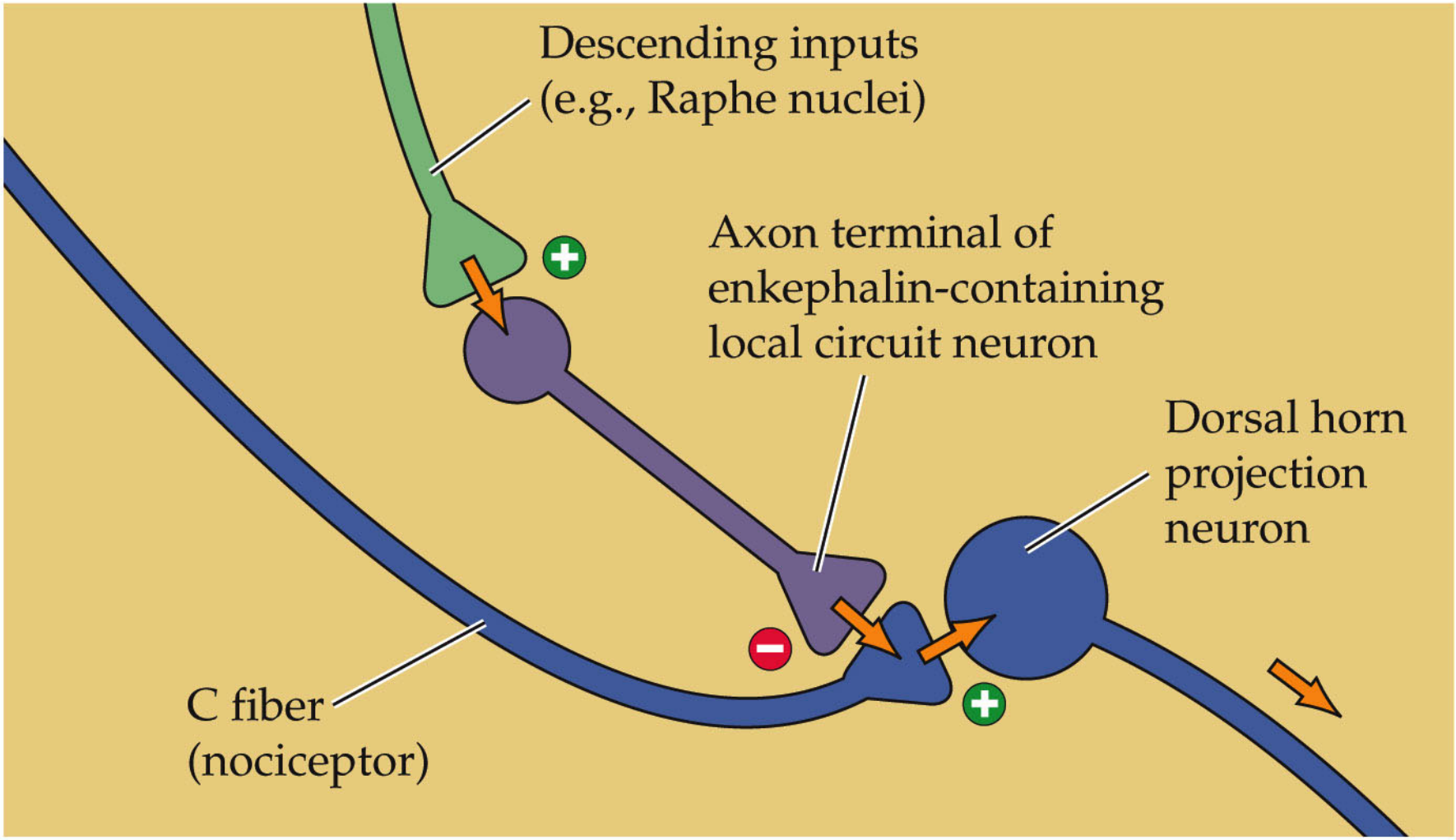


Descending systems that modulate the transmission of ascending pain signals



Descending systems that modulate the transmission of ascending pain signals

(C)



So…where is pain? In the body or in the brain?

http://www.ted.com/talks/vilayanur_ramachandran_on_your_mind.html

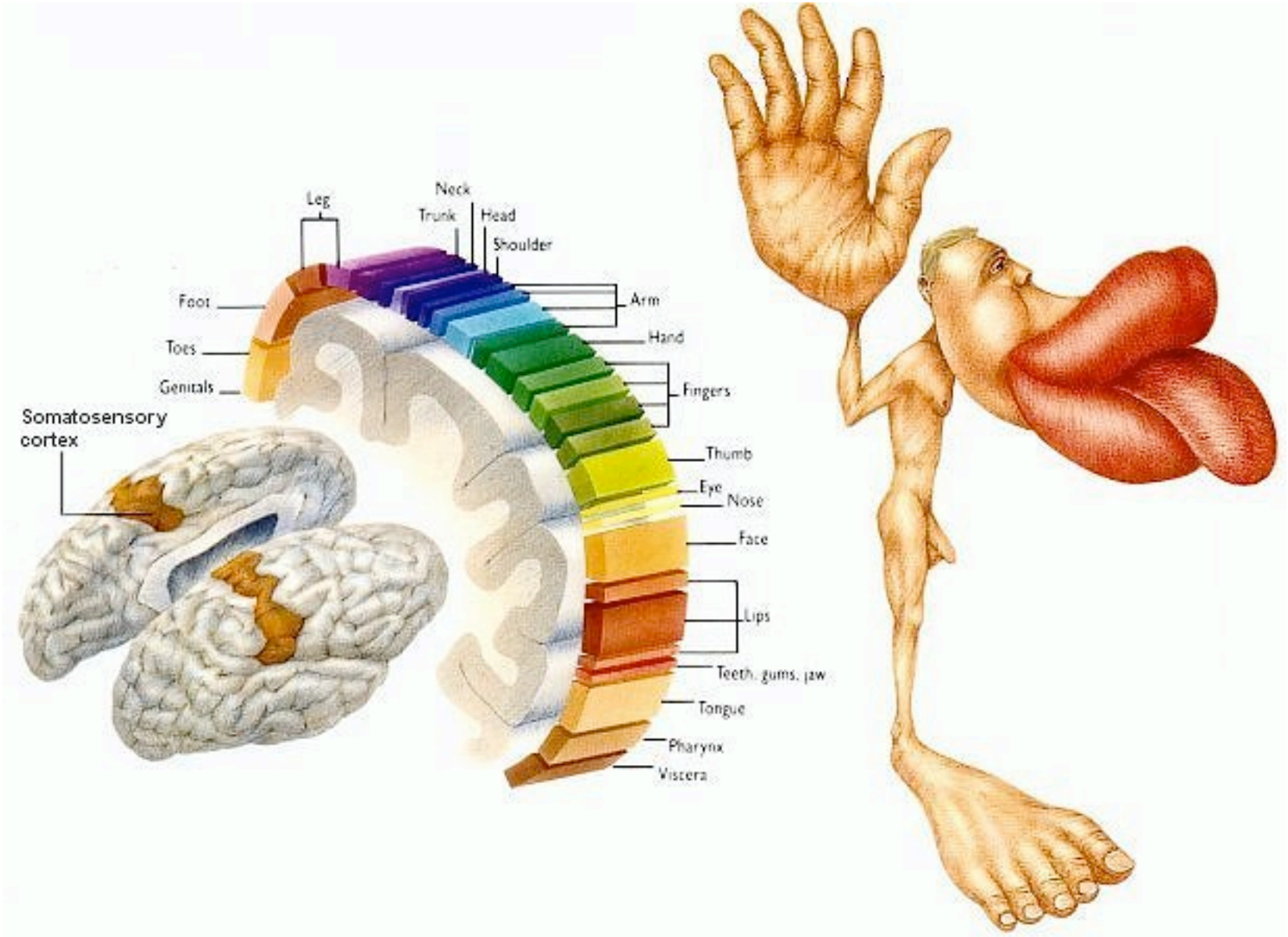
Cortical Maps

Different parts of the cortex specialize in processing different information

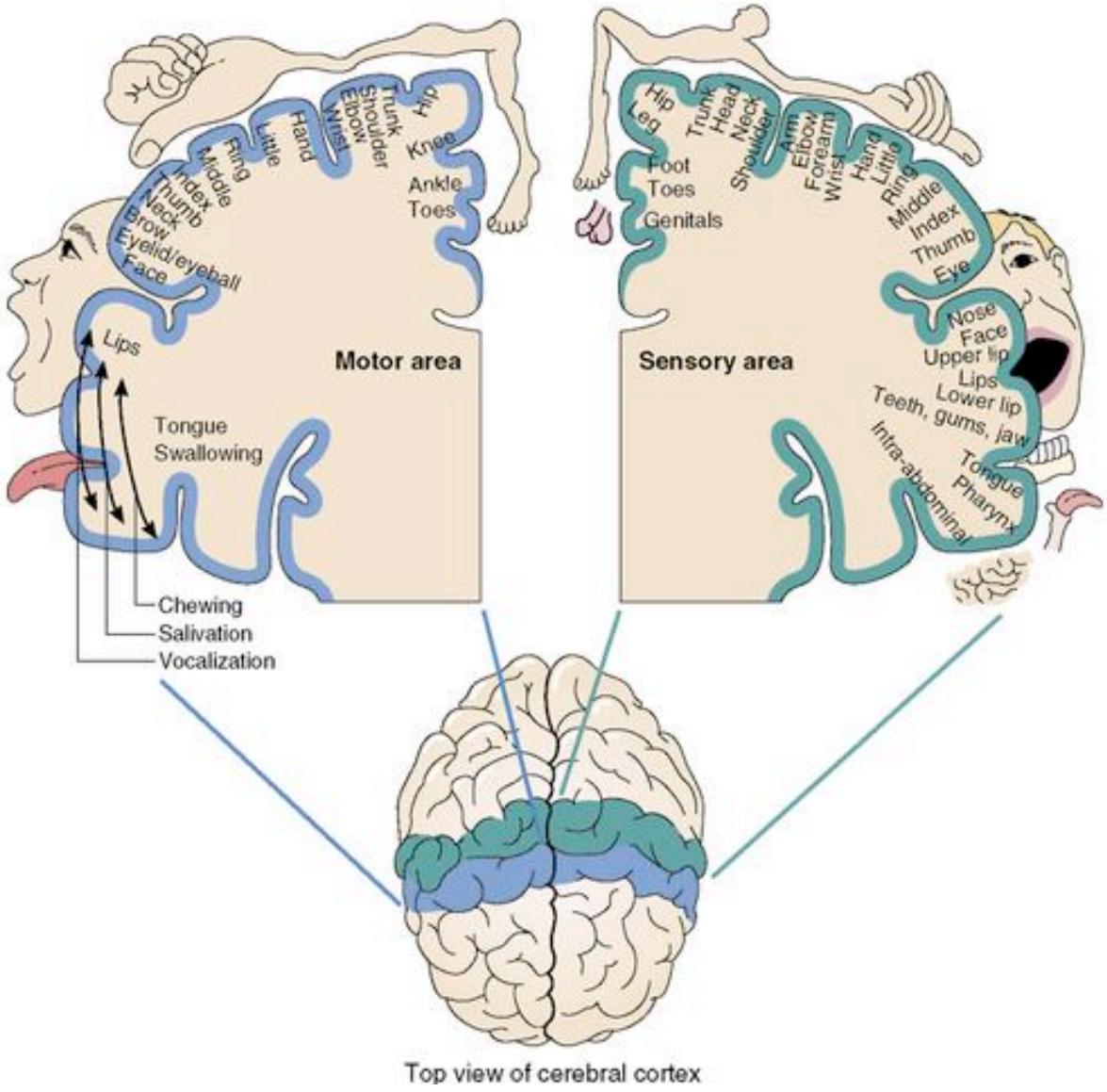
-Visual information is processed in the primary and associational visual cortices

Within a cortical region there is further specialization

The sensory cortex homonculus



Motor cortex



Top view of cerebral cortex

http://neuroscience.uth.tmc.edu/s3/chapter03.html

The motor cortex and mirror neurons

http://www.pbs.org/wgbh/nova/body/mirror-neurons.html

Mirror neurons and empathy

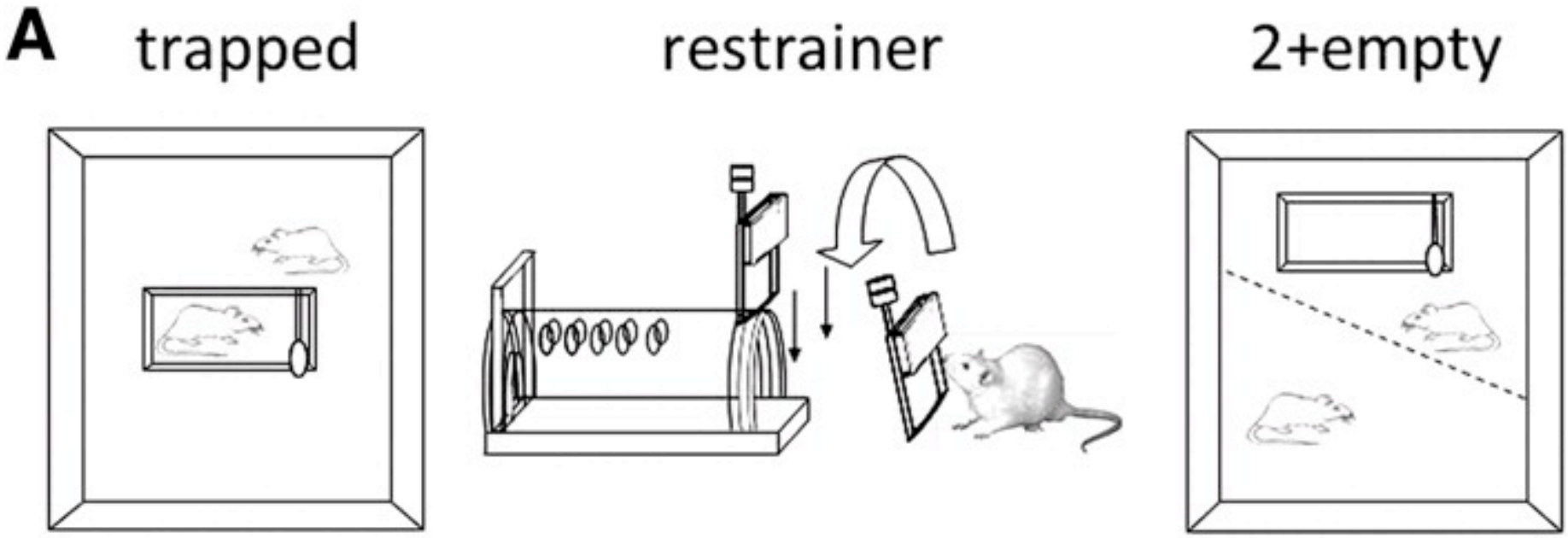
http://www.pbs.org/wgbh/nova/body/mirror-neurons.html

Emotional contagion

Hatfield et al:

Emotions can spread through a group- usually via nonverbal communication

Do rodents have empathy?


A
trapped
restrainer
2+empty

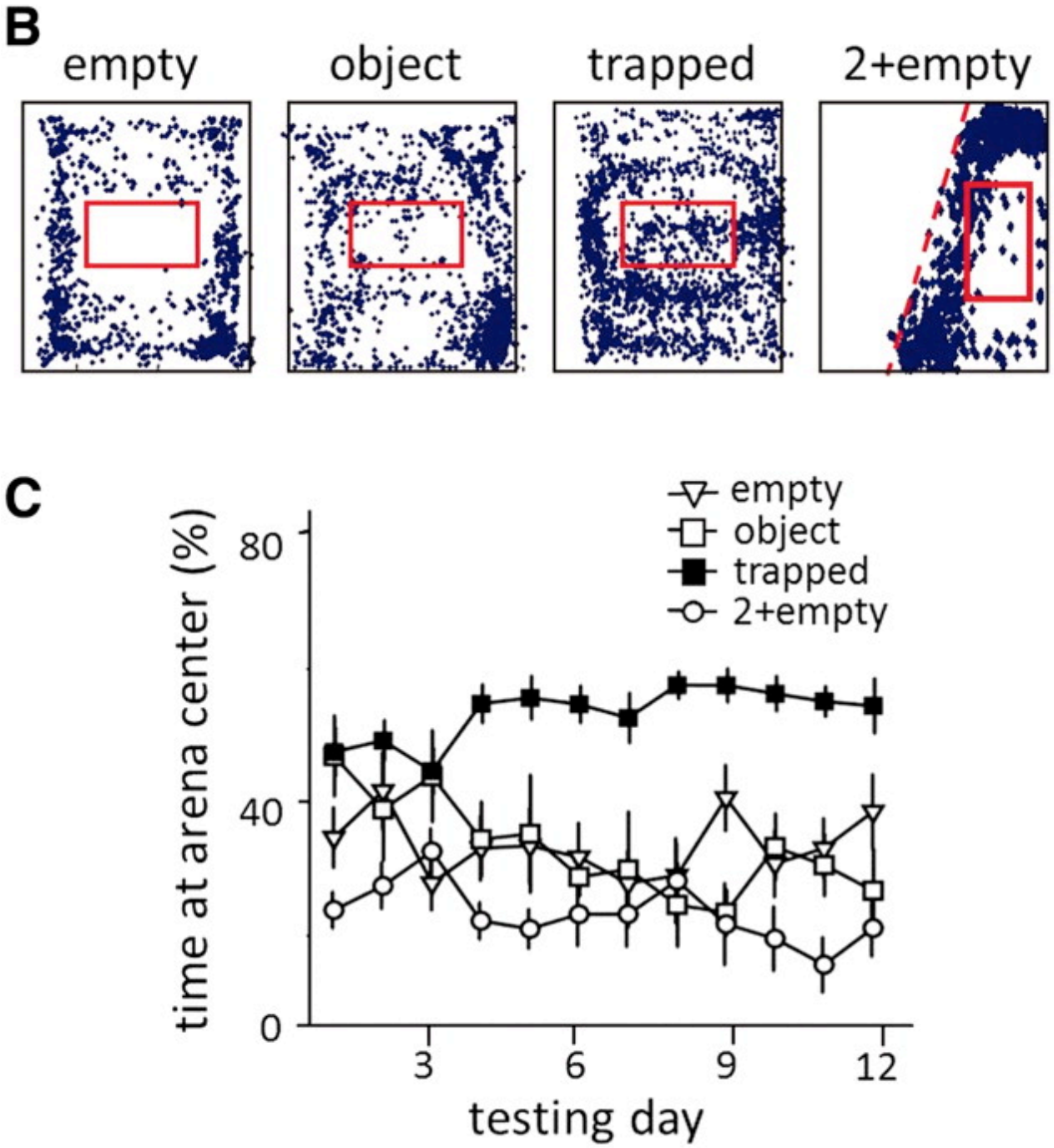
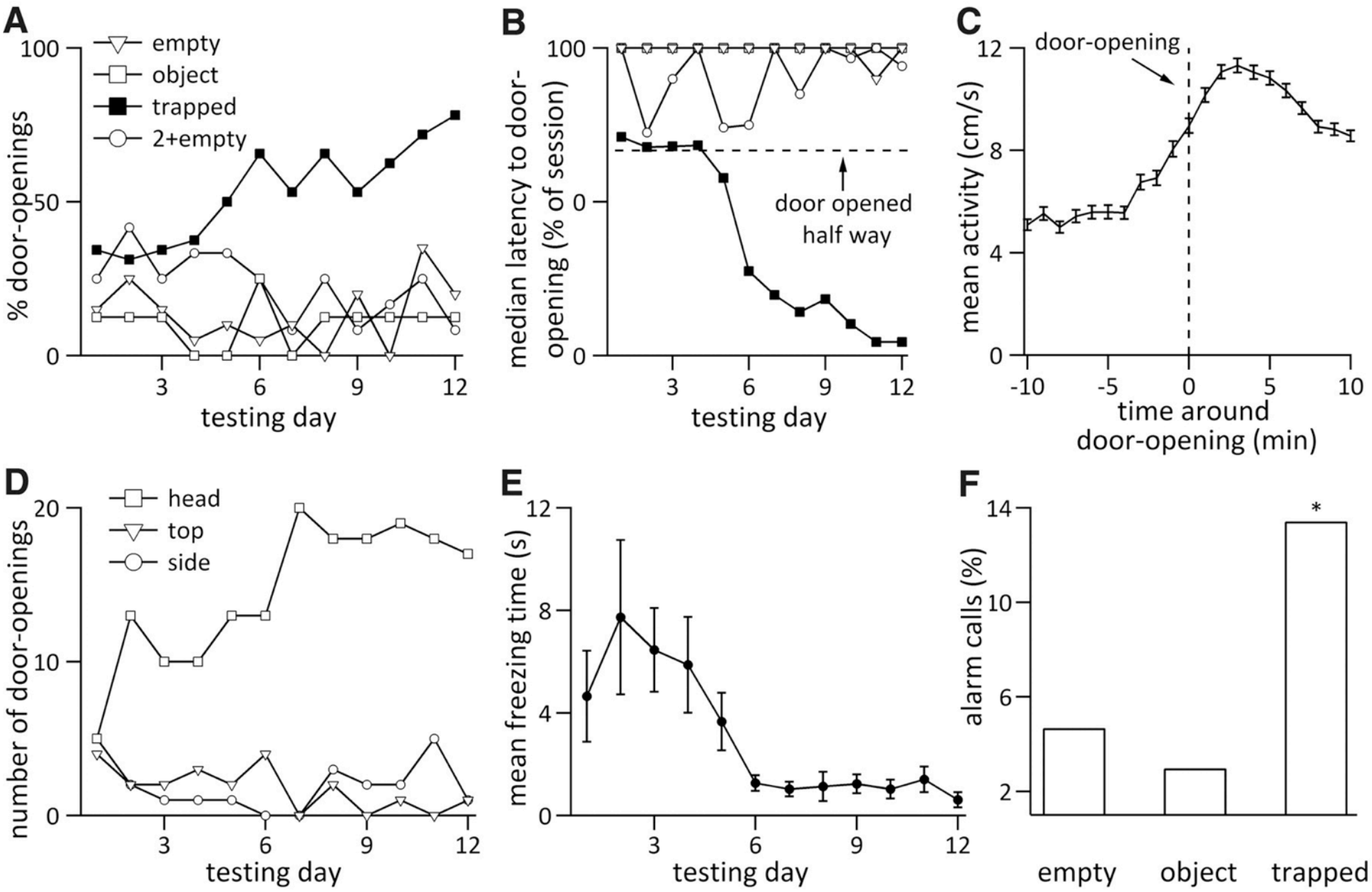
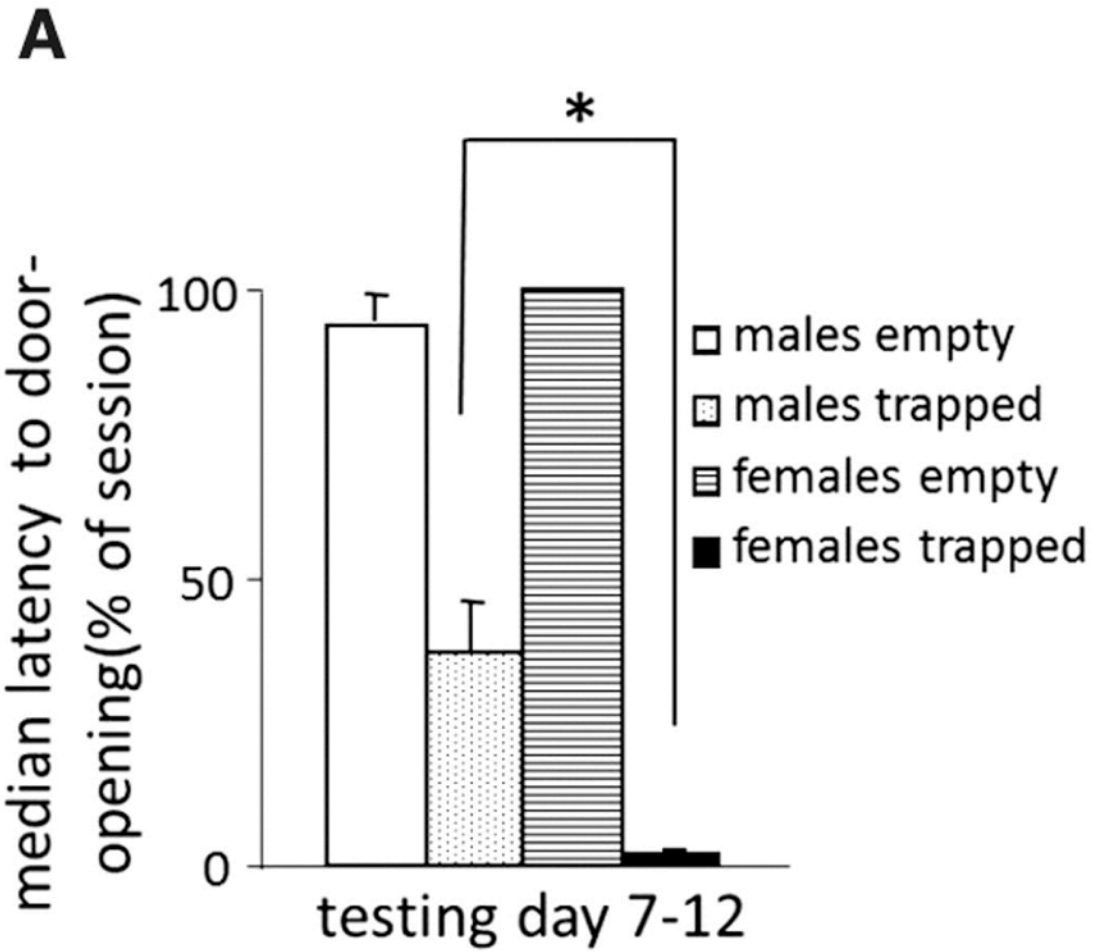
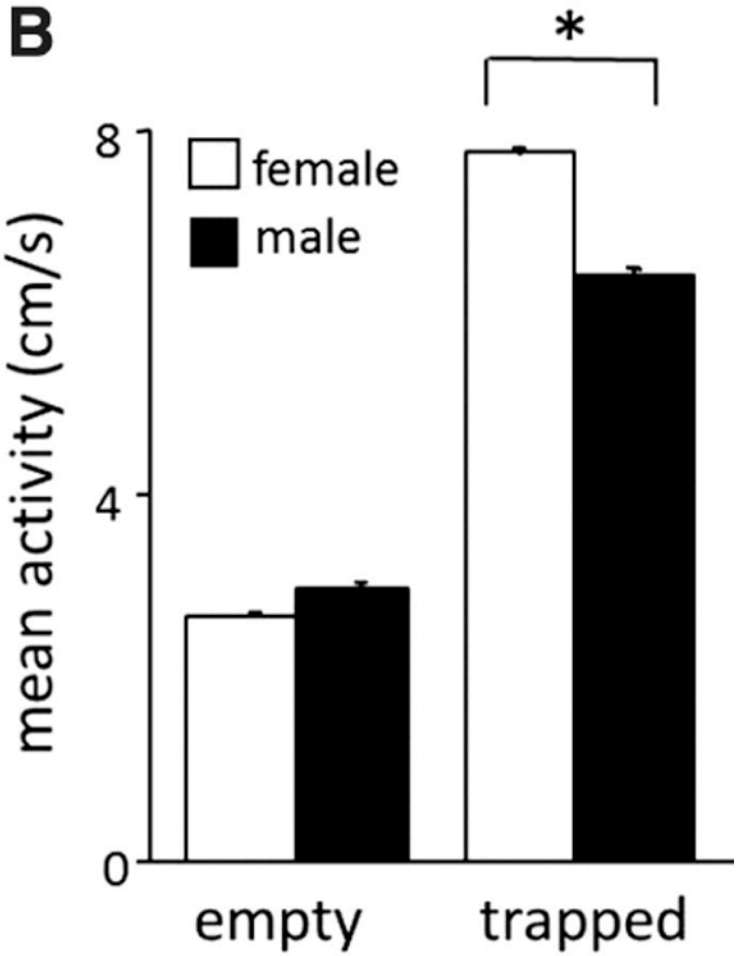

B
empty
object
trapped
2+empty
C
empty
object
trapped
2+empty
time at arena center (%)
80
40
0
3
6
9
12
testing day

Figure 2

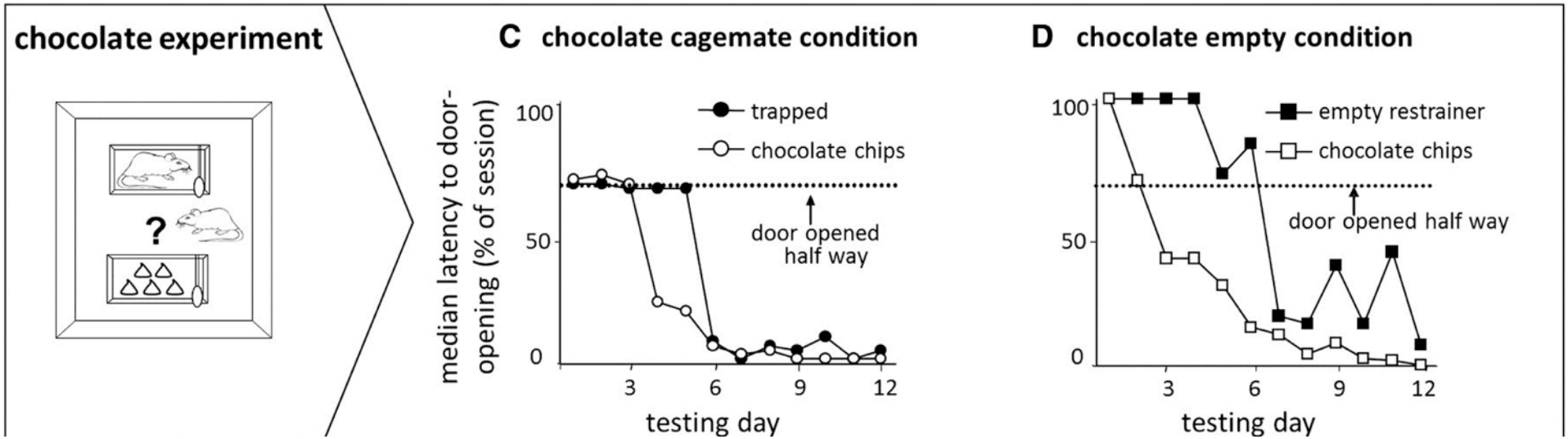

A
100
50
0
% door-openings
empty
object
trapped
2+empty
3
6
9
12
testing day
B
100
0
median latency to door-opening (% of session)
door opened half way
3
6
9
12
testing day
C
12
8
4
0
mean activity (cm/s)
door-opening
-10
-5
0
5
10
time around door-opening (min)
D
20
10
0
number of door-openings
head
top
side
3
6
9
12
testing day
E
12
8
4
0
mean freezing time (s)
3
6
9
12
testing day
F
14
10
6
2
alarm calls (%)
*
empty
object
trapped

Do males and females both show empathy?

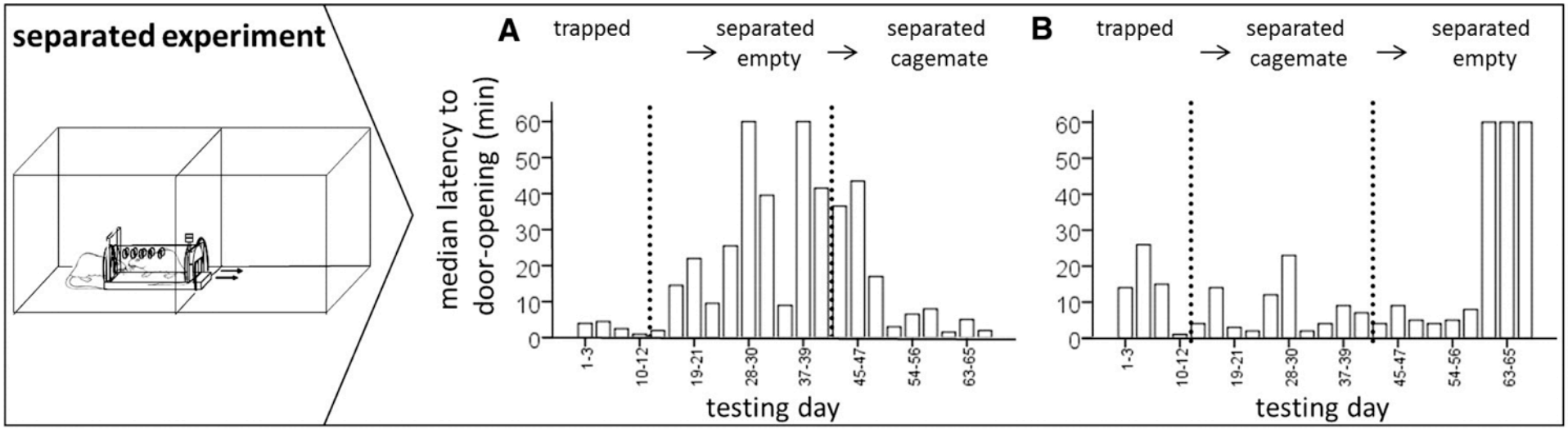




The true test of empathy… the chocolate sacrifice!



Will rats free others even if they don't get the 'reward' of social interaction?



http://video.sciencemag.org/VideoLab/1310979895001/1