

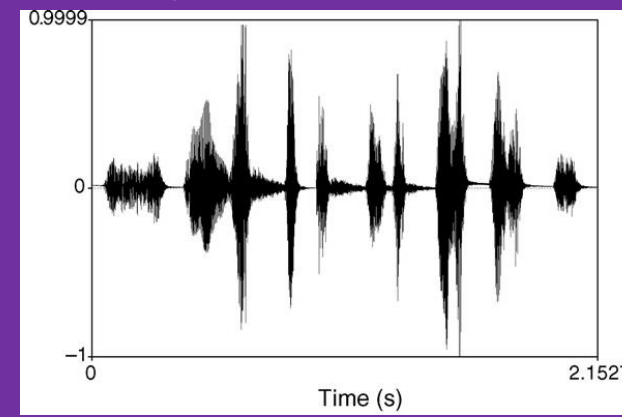
# NEUROBIOLOGY OF LAUGHTER

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## INTRODUCTION

### What is laugh?

Laughter is an instinctive, early appearing, contagious vocalization produced in social settings ranging from conversation to tickle. It is manifested mainly in the face, as a high frequency pant with or without vocal cords' vibration, and usually accompanied by the play face (retracted lips, half-open mouth). It starts at the age of 4 months (2 months before babbling), but in adulthood it is used mostly as a punctuation sign – even among deaf singers.



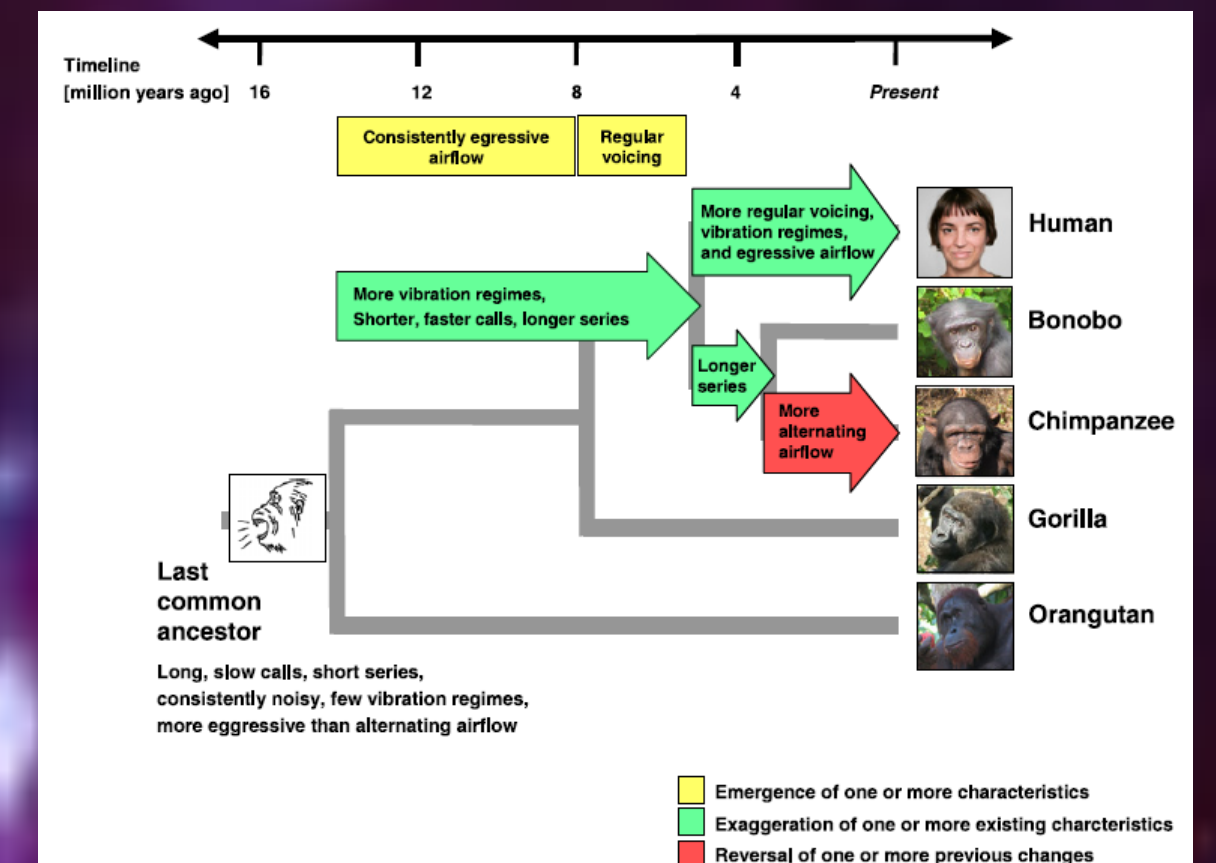
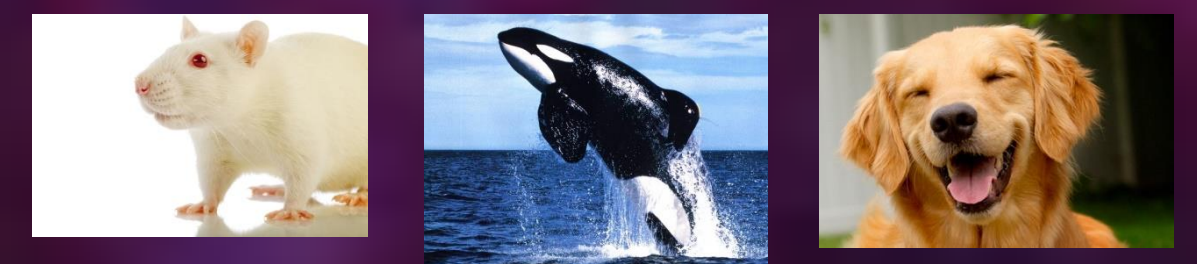
Meyer, M et al. How the brain laughs. *Behavioural Brain Research*, 182(2), 245–260. (2007)

### Evolution

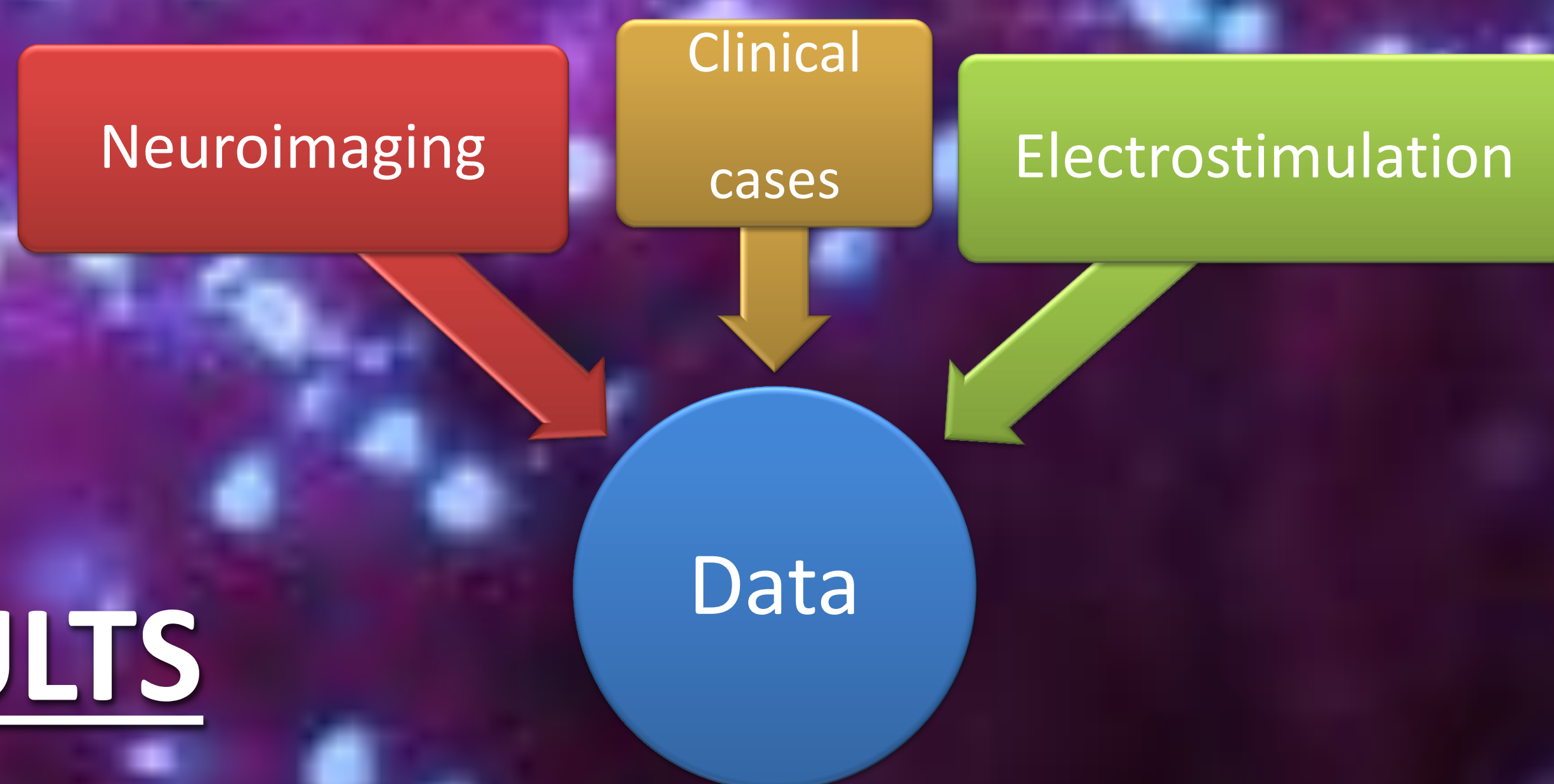
Laughter is not only a human trait. Orangutans, gorillas, chimpanzees, and bonobos produce laughter when tickled or in playful situations. Dogs, laboratory rats and killer whales have universal vocalizations akin to human laugh.

## OBJECTIVE

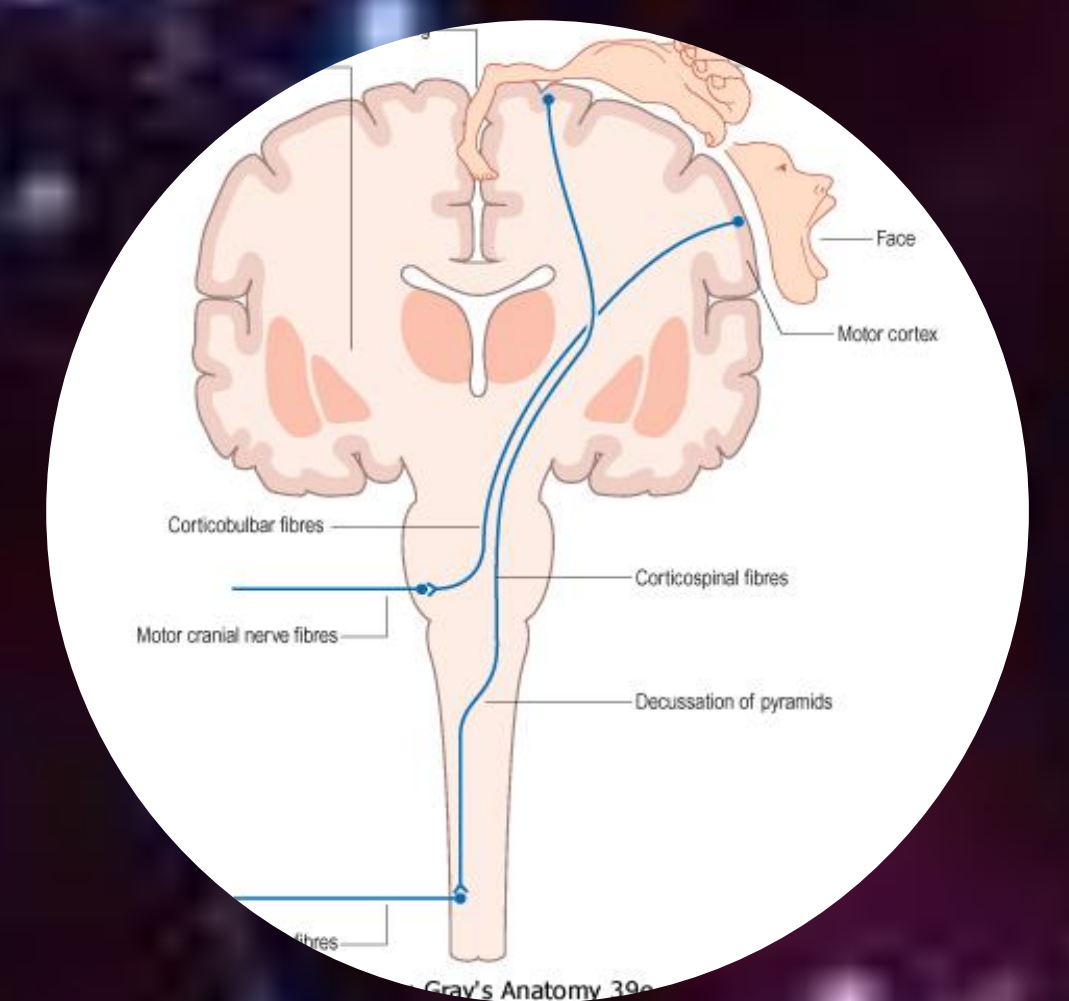
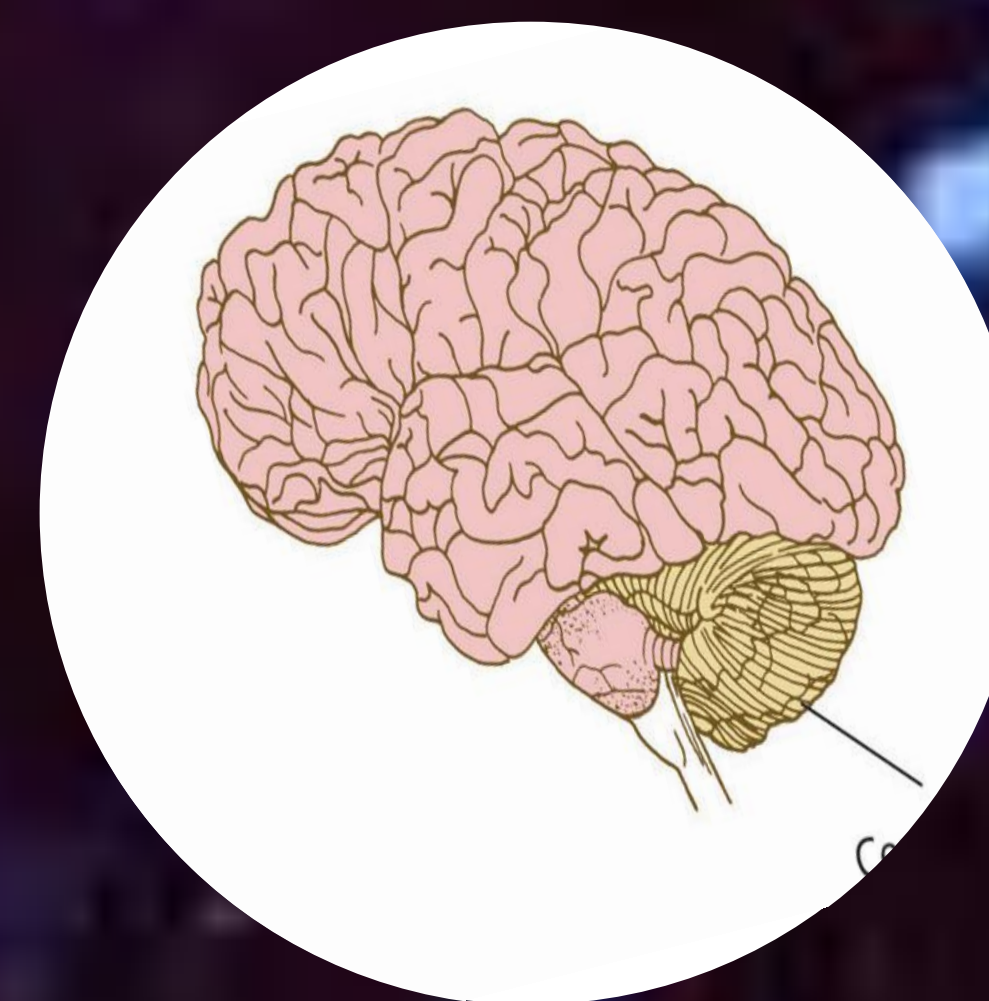
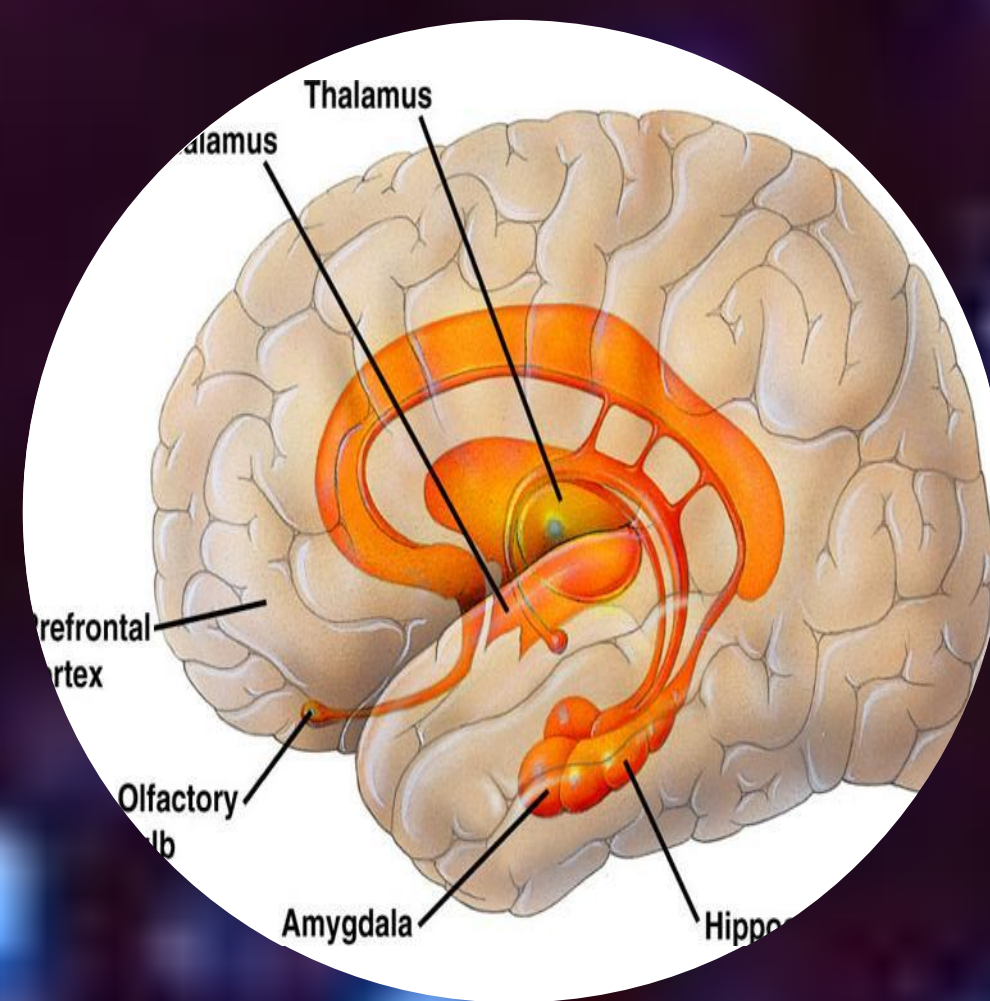
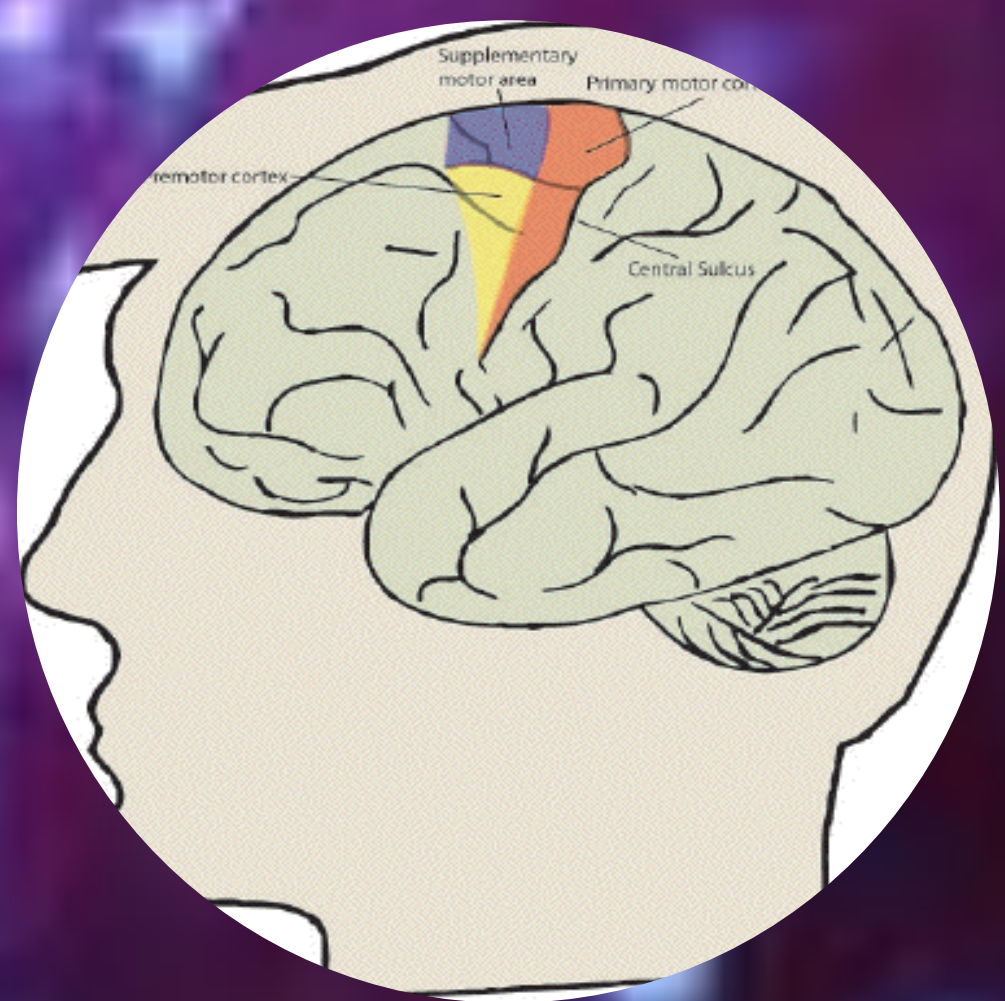
To identify the neural circuits involved in the production of laughter in humans.



Davila Ross, M et al. Reconstructing the Evolution of Laughter in Great Apes and Humans. *Curr. Biol.* 19, 1106–1111 (2009).



## RESULTS



**Supplementary motor area**  
Modulates and inhibits laughter. Allows recognition of happiness facial expressions

**Cingulate gyrus**  
Important in the control of laughter: trying to inhibit laughter or forcing it. The anterior cingulate cortex is intimately related to detection of incongruity, and hence perhaps various kinds of humour-related emotional perceptions and decision-making.

**Limbic system**  
Produces laughter in the tuberolateral region of the hypothalamus. Generates physiological effects accompanying laugh, and the characteristic feeling of mirth.

**Cerebellum**  
Triggers laughter episodes. Modulates laughter the same way as any other motor function. Lesions can cause pathological laughter.

**Corticobulbar tracts**  
Final common pathway for laughter, integrating facial expression, respiration, and autonomic reactions.

## DISCUSSION

There are few articles on the topic, research needs to be done in order to confirm current hypothesis and open new horizons. Animal laughter has to be analyzed exhaustively, as it will help us understand the evolution of the SNC, language and social abilities, mainly in mammals.

Laughter is a complex neural process characteristic of the human beings, and as such it has interest for neurobiologists who want to fully understand the brain. Laugh production implies emotional, cognitive and motor processes, along with physiological changes. All these processes and the effects that laughter perception has in the brain remain unknown, and the few studies done in the subject are fragmentary and isolated. It is necessary to start coordinated research about laughter, leaving behind the frivolous idea that laughter and humour don't deserve the attention of scientists.