



THE BIOLOGY OF LOVE

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Homo neanderthalis, Shanidar I
40,000 years ago



Homo erectus, Dmanisi
1,800,000 years ago



Barron & Peewee

Photo: Aaron Sandel







WHAT IS A BOND?



WHY BOND?



Corythoichthys haematopterus

WHY BOND?



Ranitomeya imitator

WHY BOND?

Ranitomeya imitator





HOW DO BONDS WORK?



The prairie vole
Microtus ochrogaster

HOW DO BONDS WORK?

♂ 14 M.OCH
FIELD BRAINS

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FIELD BRAINS

♂ 14 M.OCH

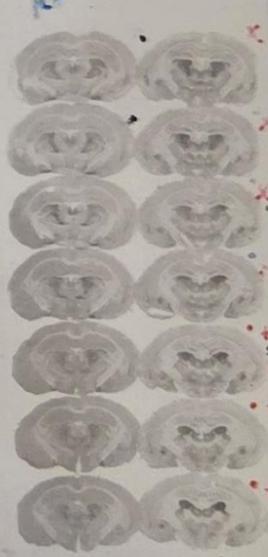
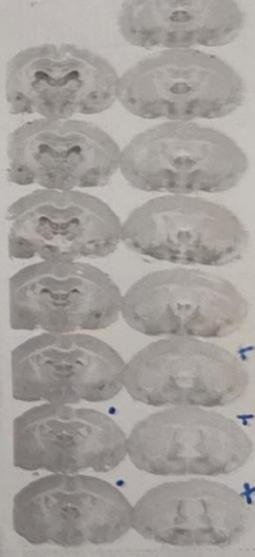
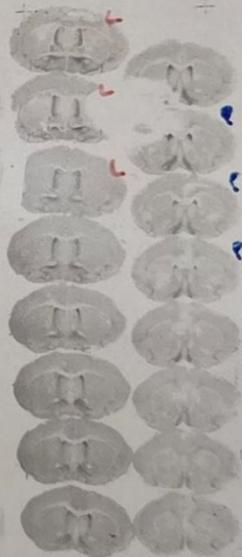
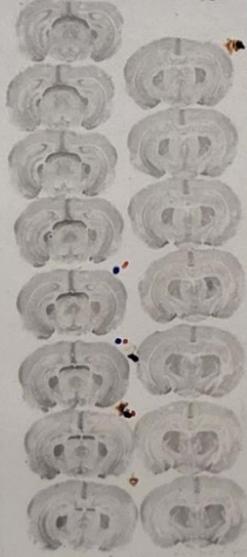
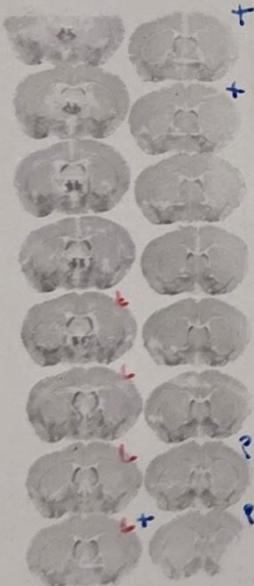
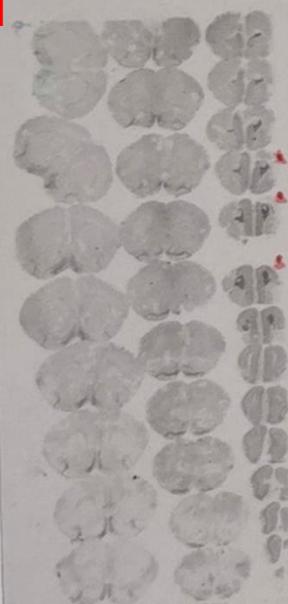
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FIELD BRAINS

♀ 12 M.OCH

♀ 13 M.OCH
FIELD BRAINS
7D

♀ 13 M.OCH

♀ 13 M.OCH
FIELD BRAINS



♂ 26 M.OCH
FIELD BRAINS
10-13-00SP
4-12-01

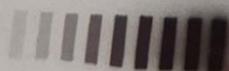
♂ 26 M.OCH
FIELD BRAINS

♂ 26 M.OCH
FIELD BRAINS
10-13-00SP
4-12-01

♂ 26 M.OCH
FIELD BRAINS
10-13-00SP
4-12-01

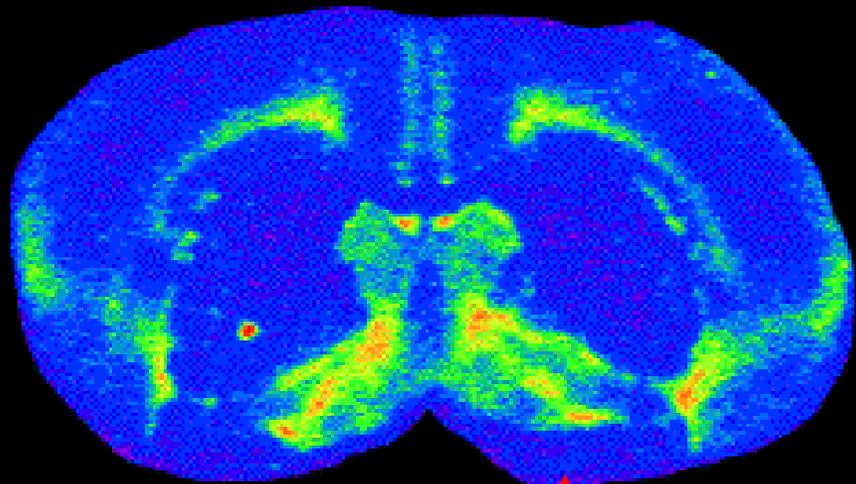
♀ 11 M.OCH
FIELD BRAINS
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4-12-01

RETROSP. OF (P. 116)

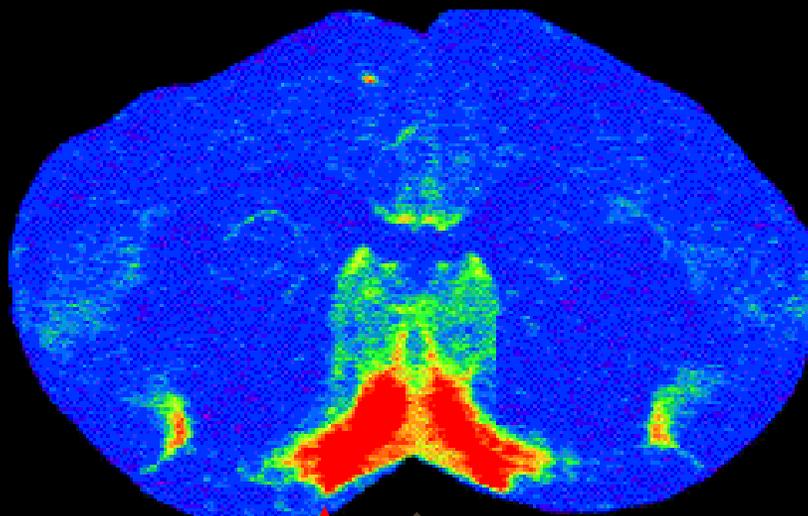


HOW DO BONDS WORK?

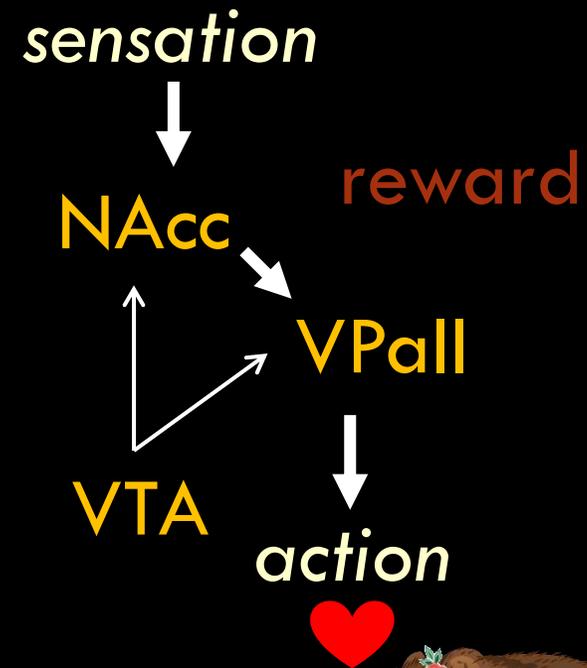
Montane vole



Prairie vole

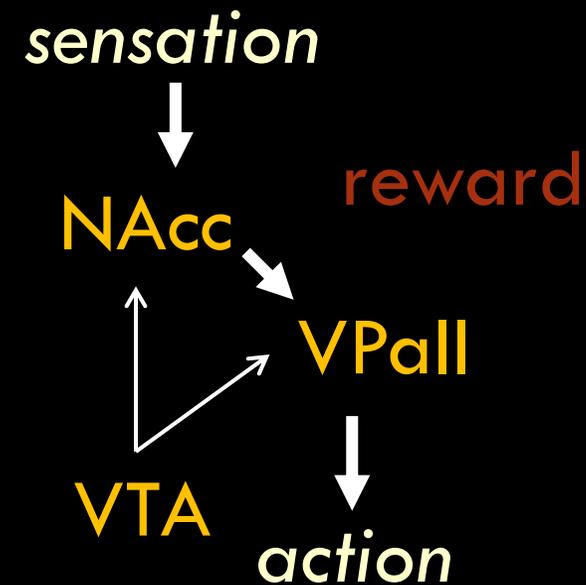
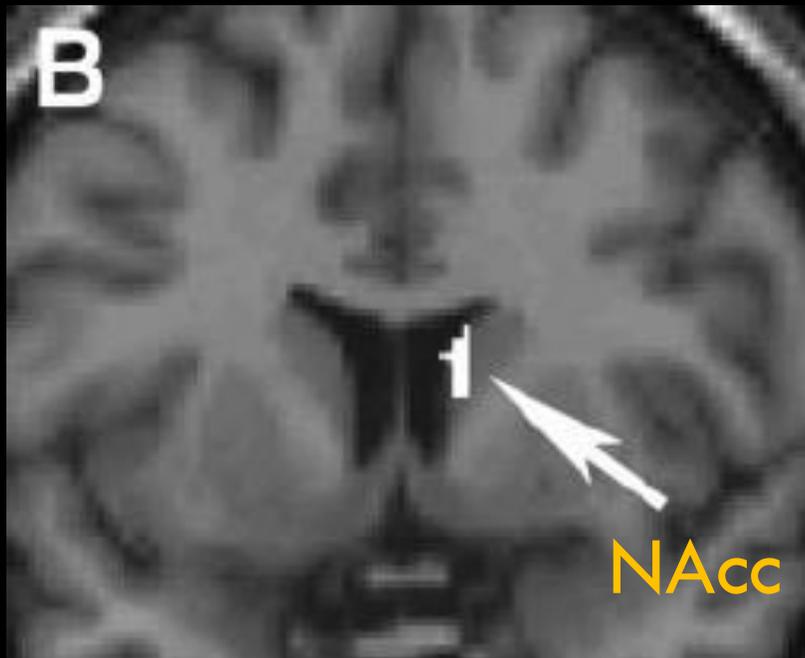
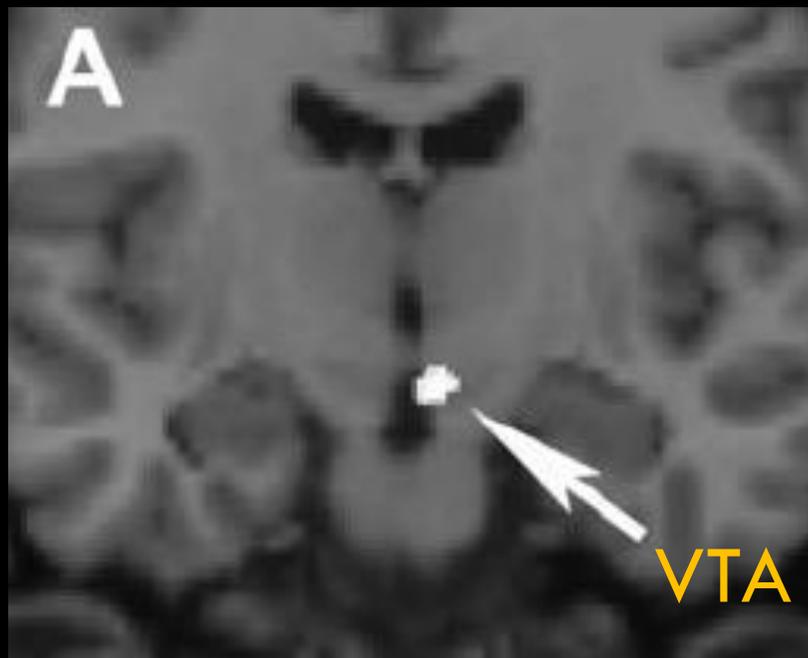


ventral pallidum
(VPall)



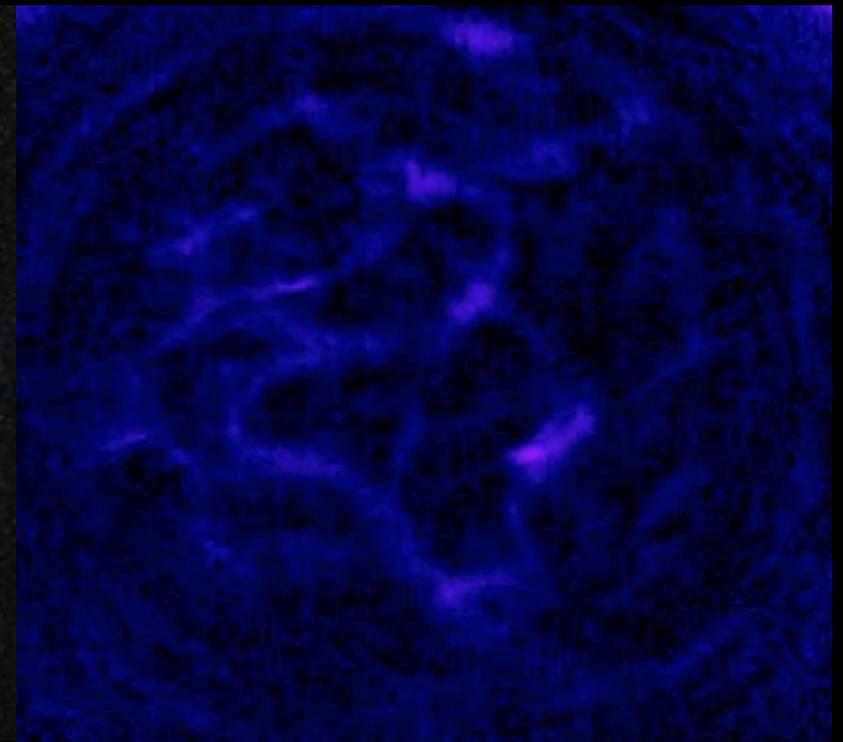
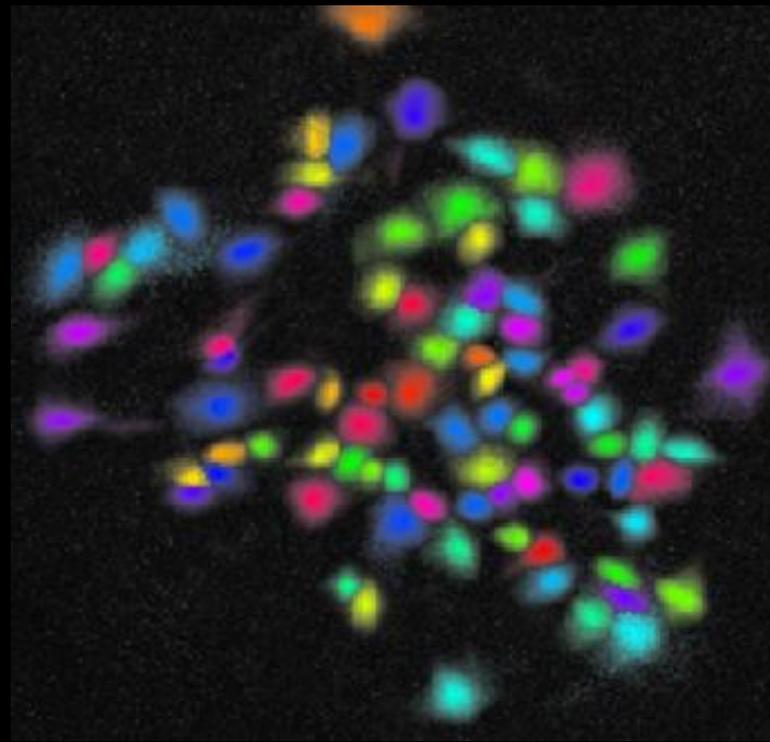
HOW DO BONDS WORK?

How much do you love your partner?



Aron et al 2005

HOW DO BONDS WORK?

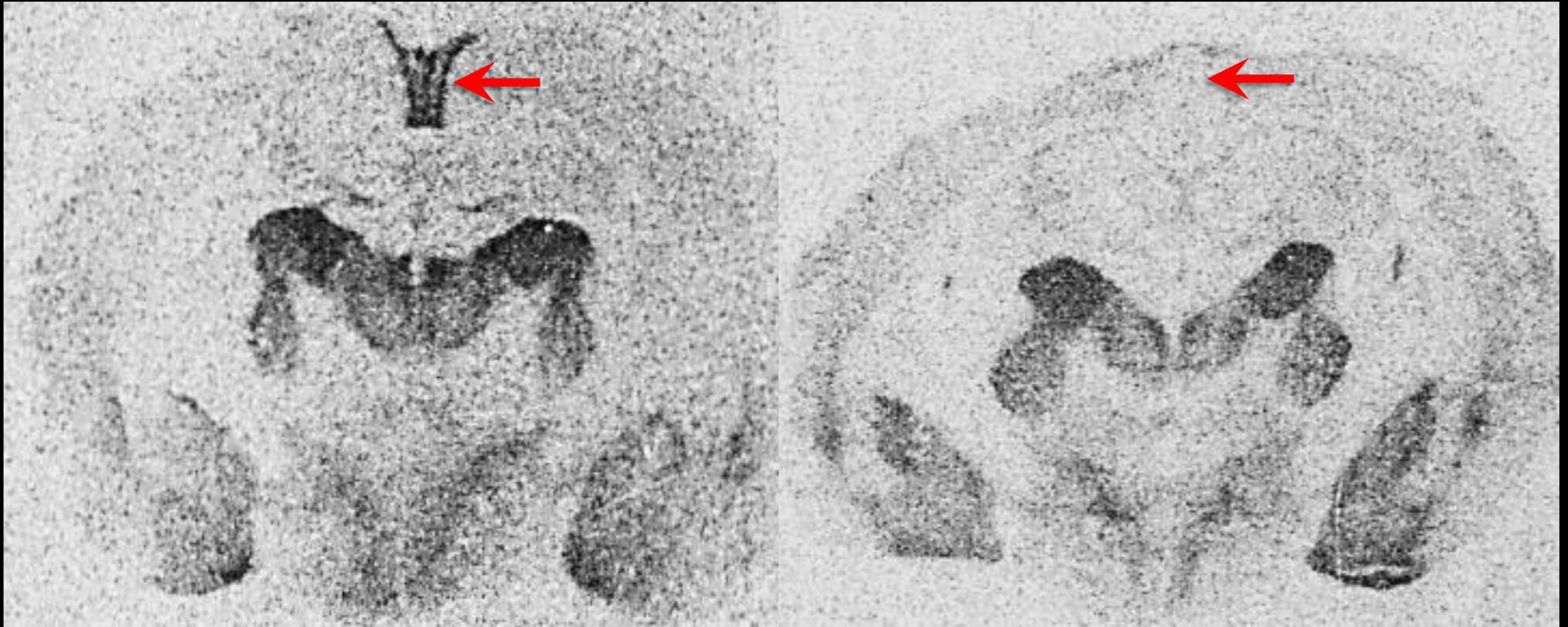




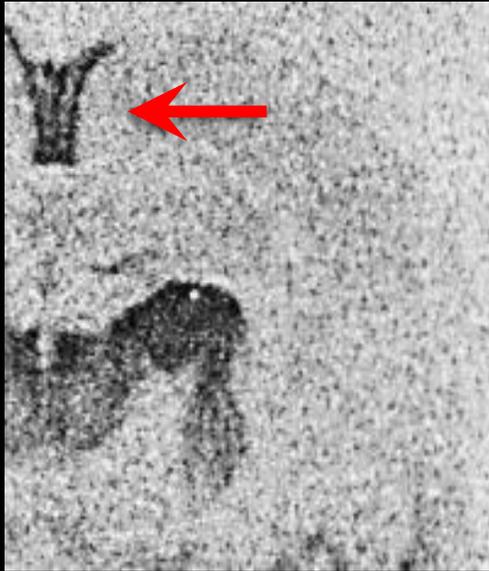
INDIVIDUALS VARY IN BRAIN & BEHAVIOR



INDIVIDUALS VARY IN BRAIN & BEHAVIOR

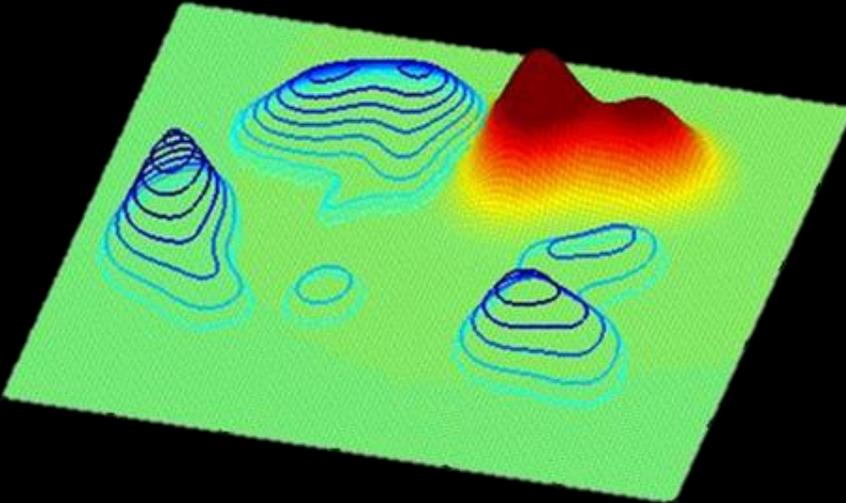






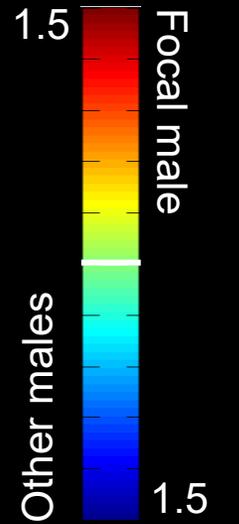
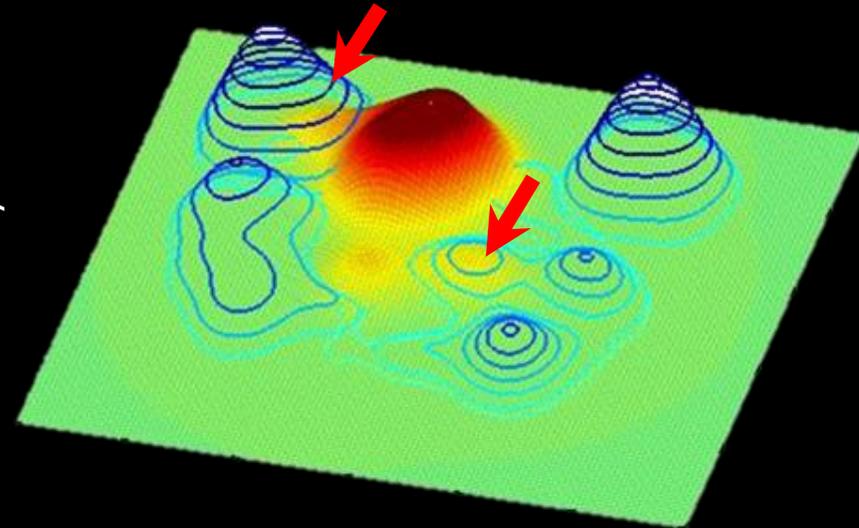
Faithful

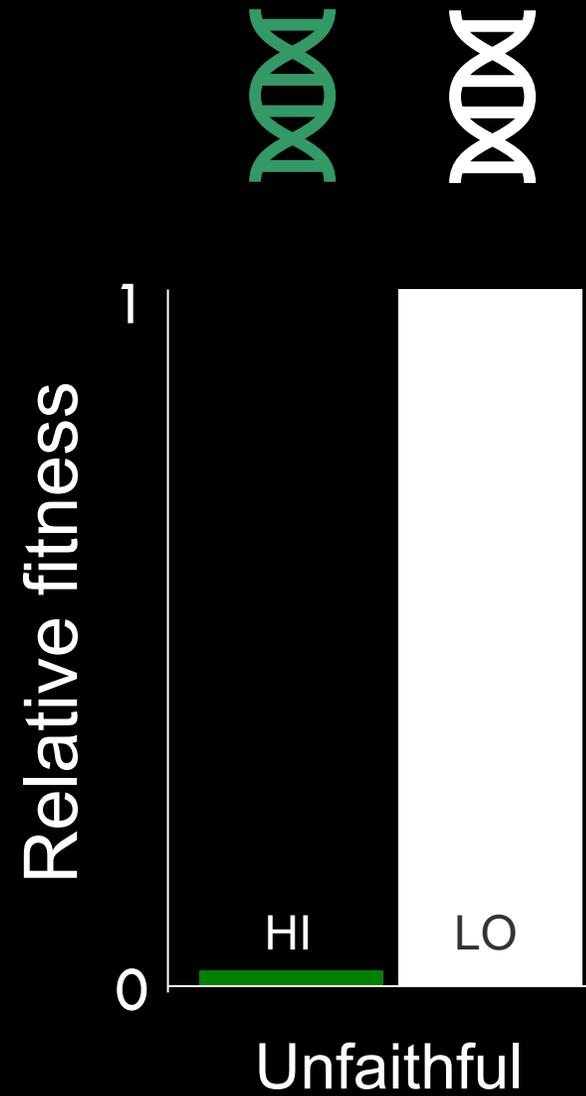
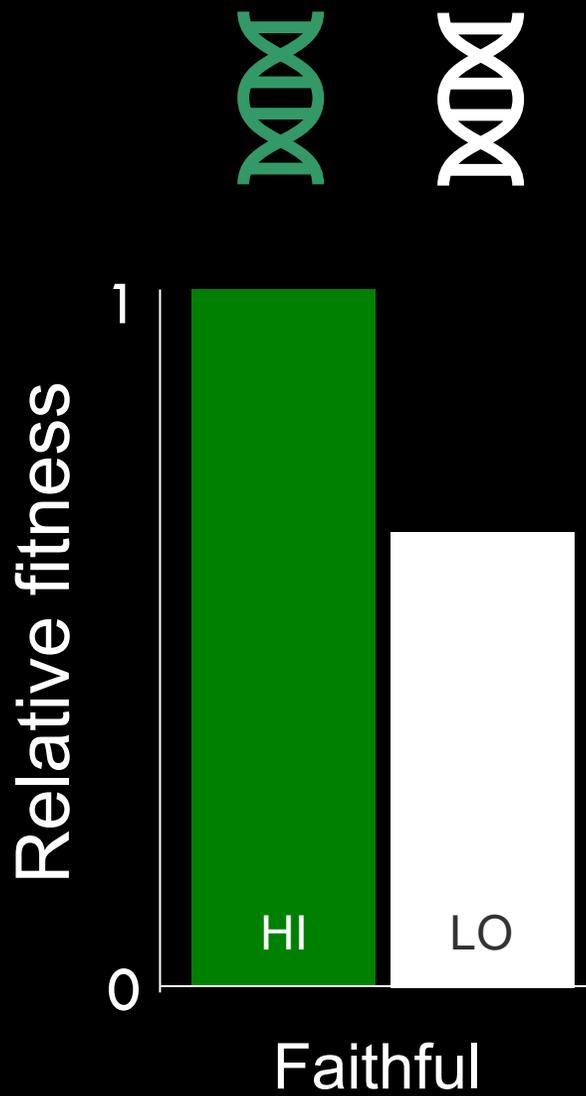
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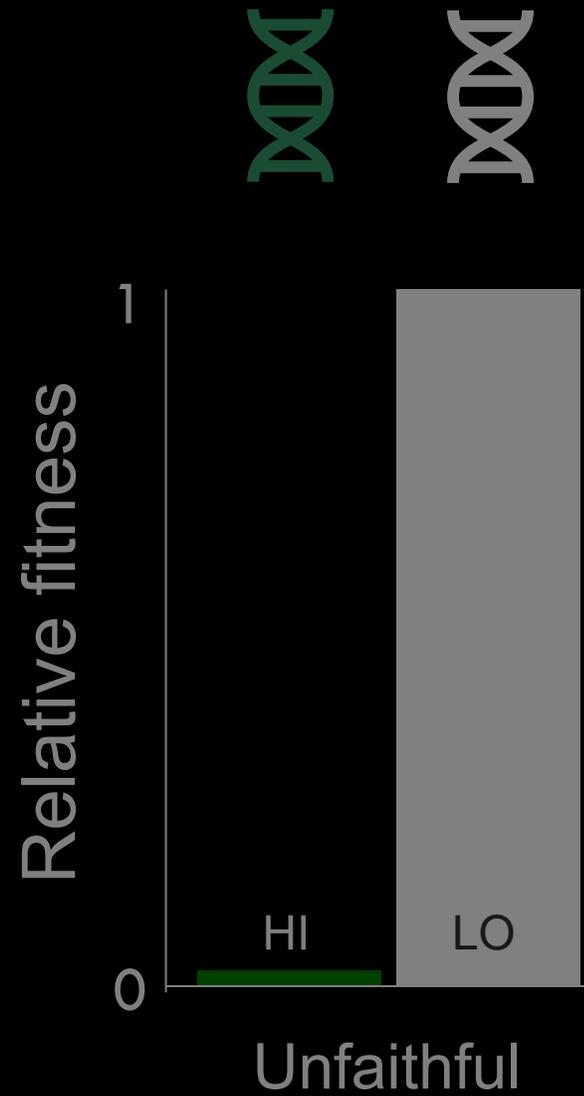
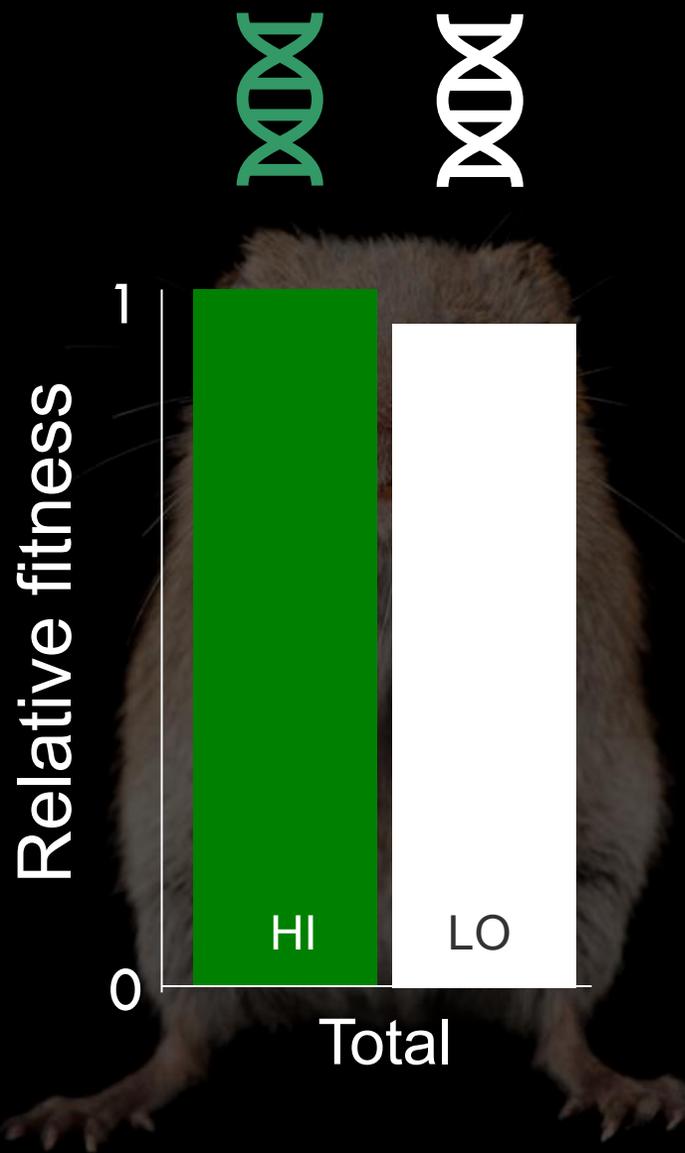
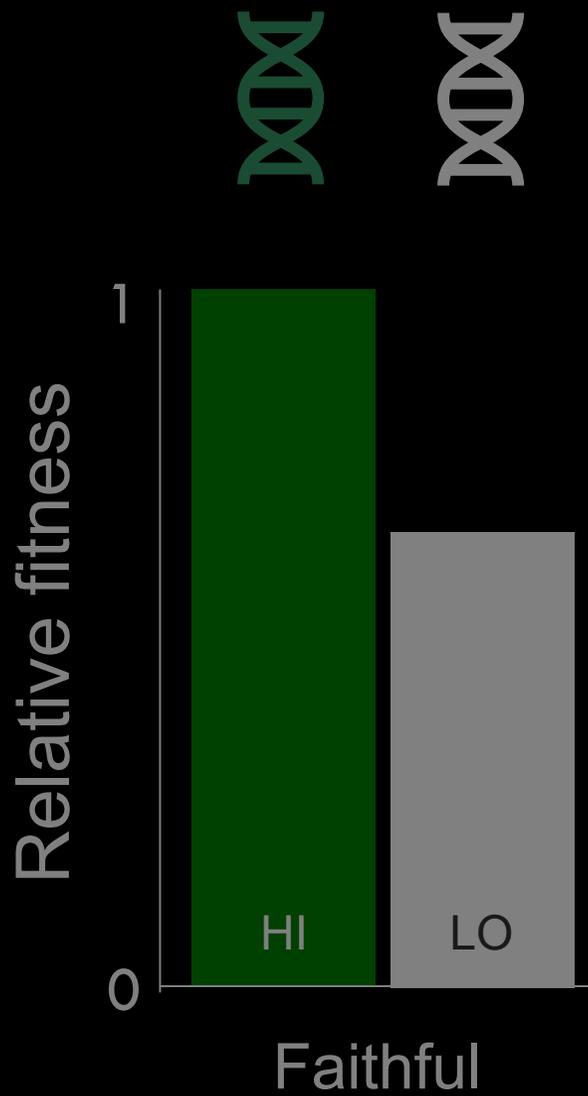


Unfaithful

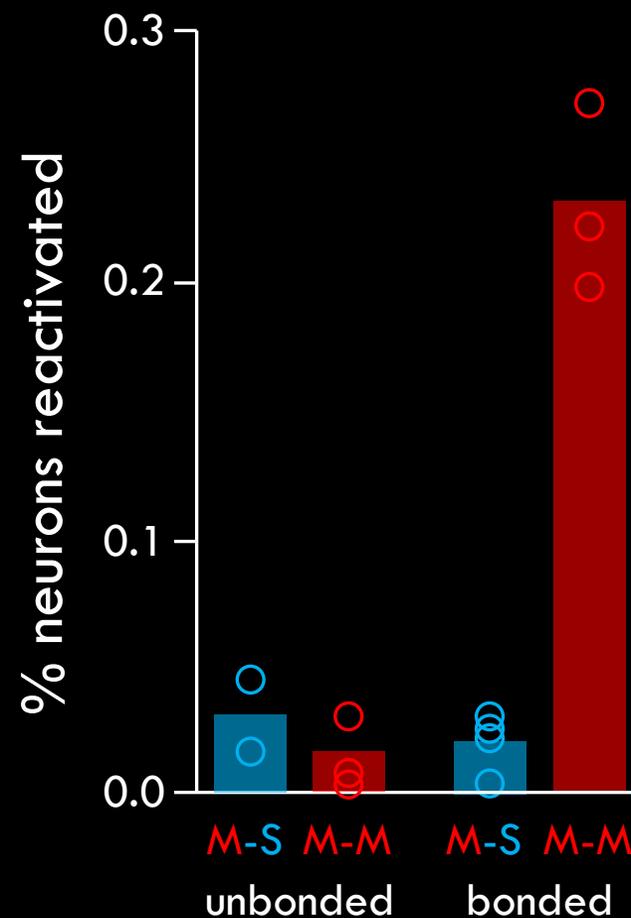
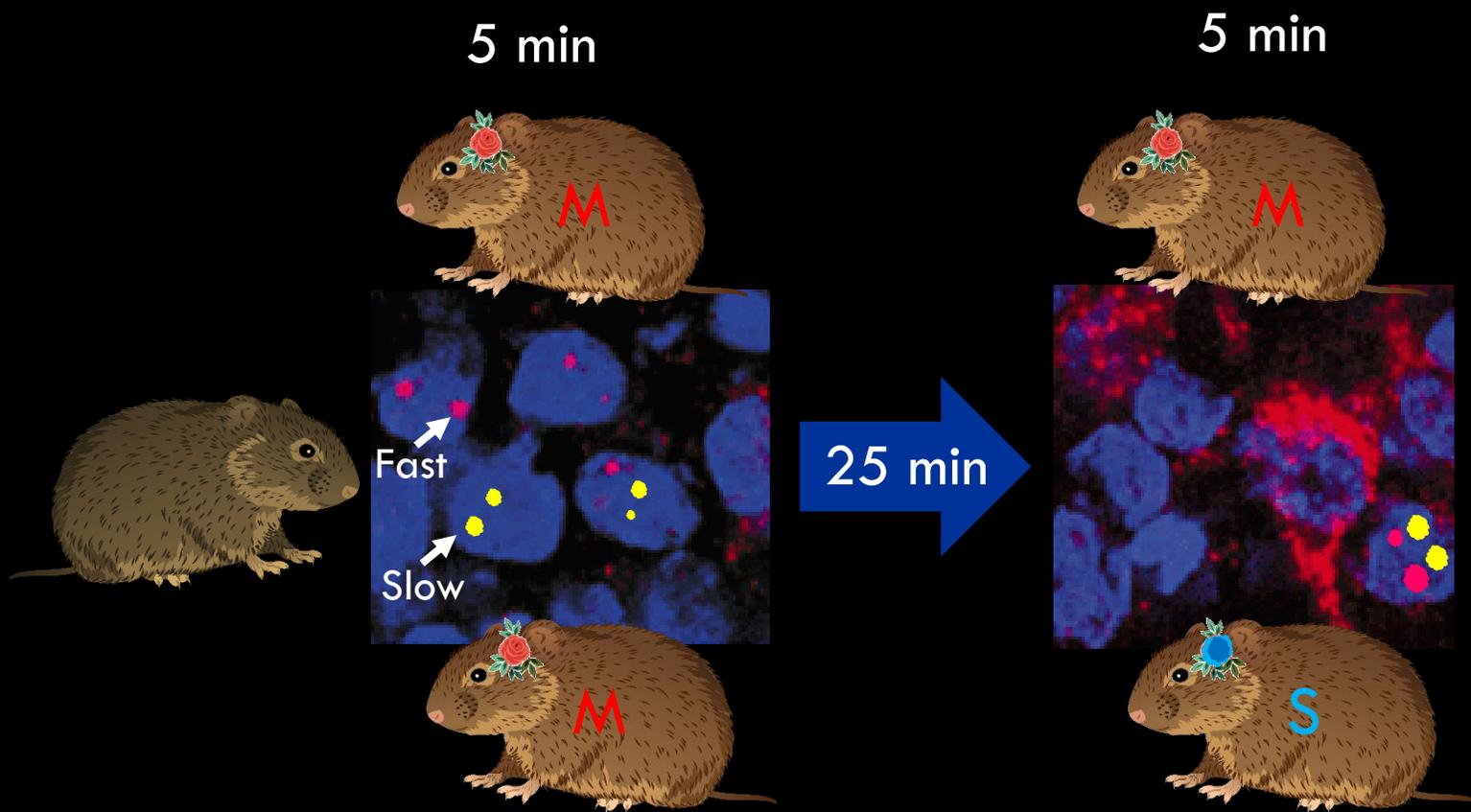
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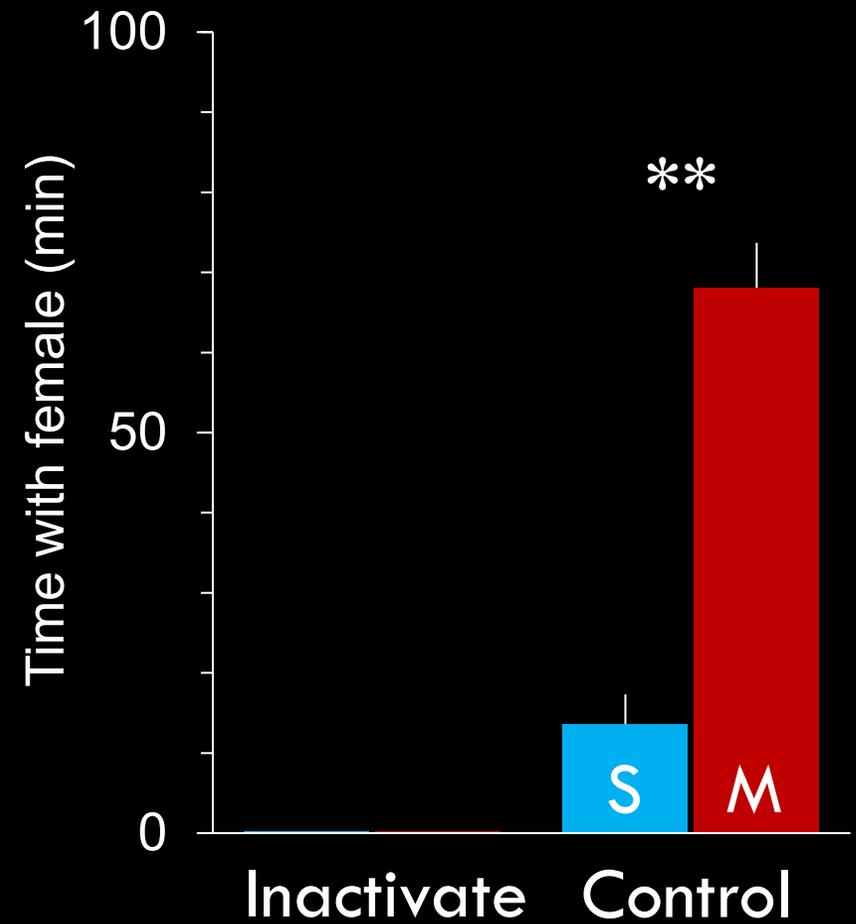


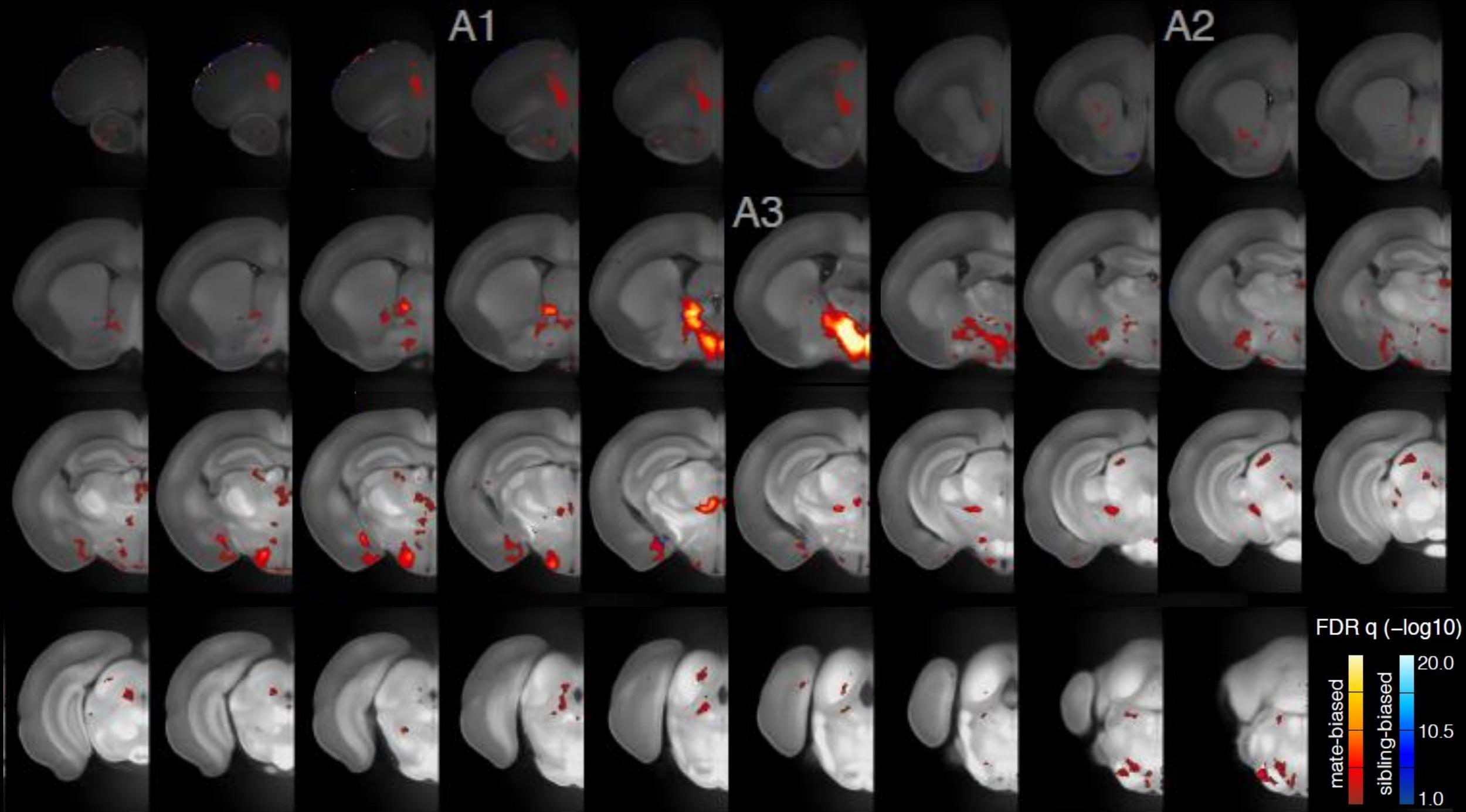


MEMORY FOR A MATE?

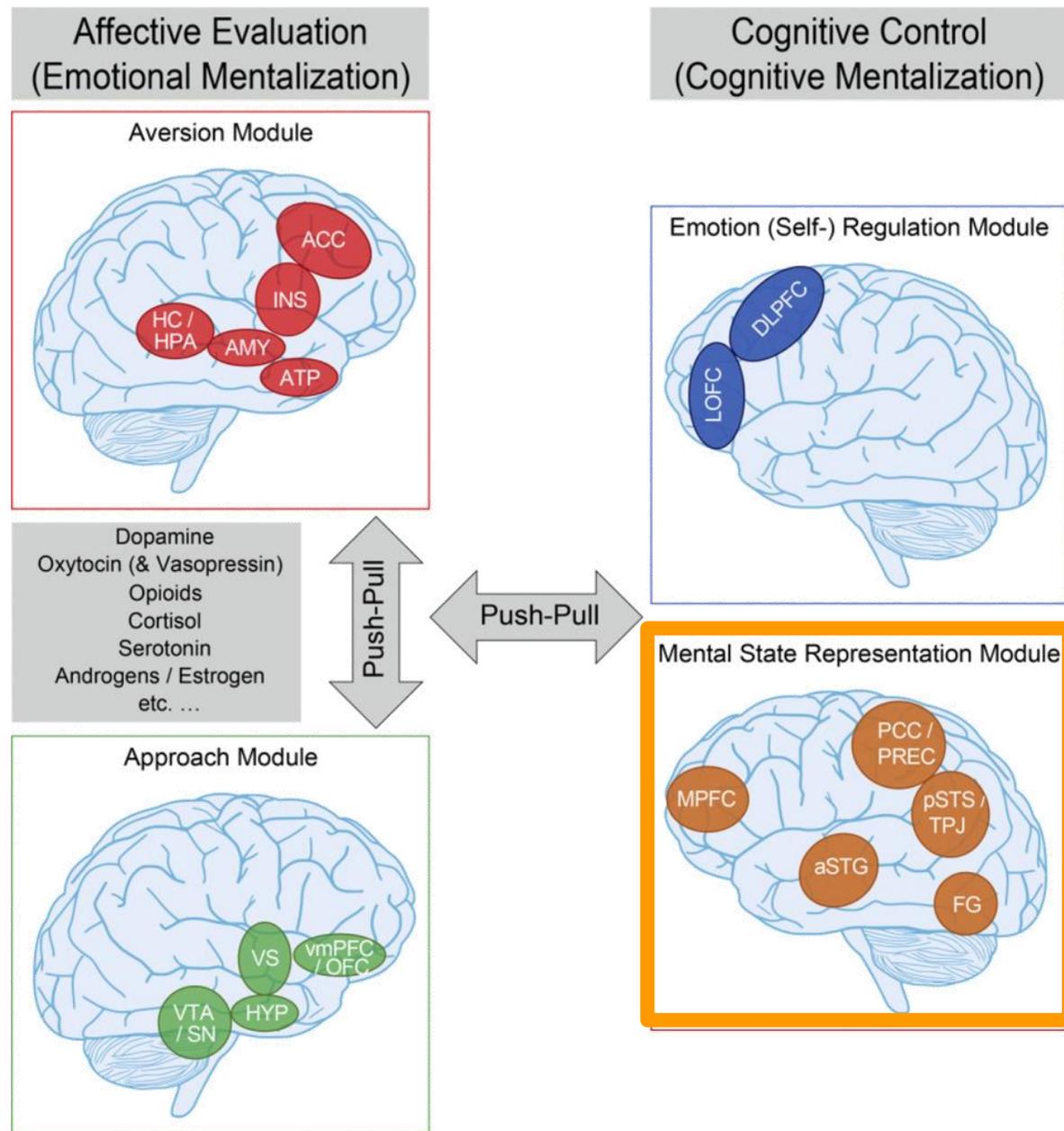


MEMORY FOR A MATE?





LOVE IS MORE THAN REWARD & MEMORY



Neuro-anatomical model of attachment. Long et al. 2020

BONDS ARE ESSENTIAL

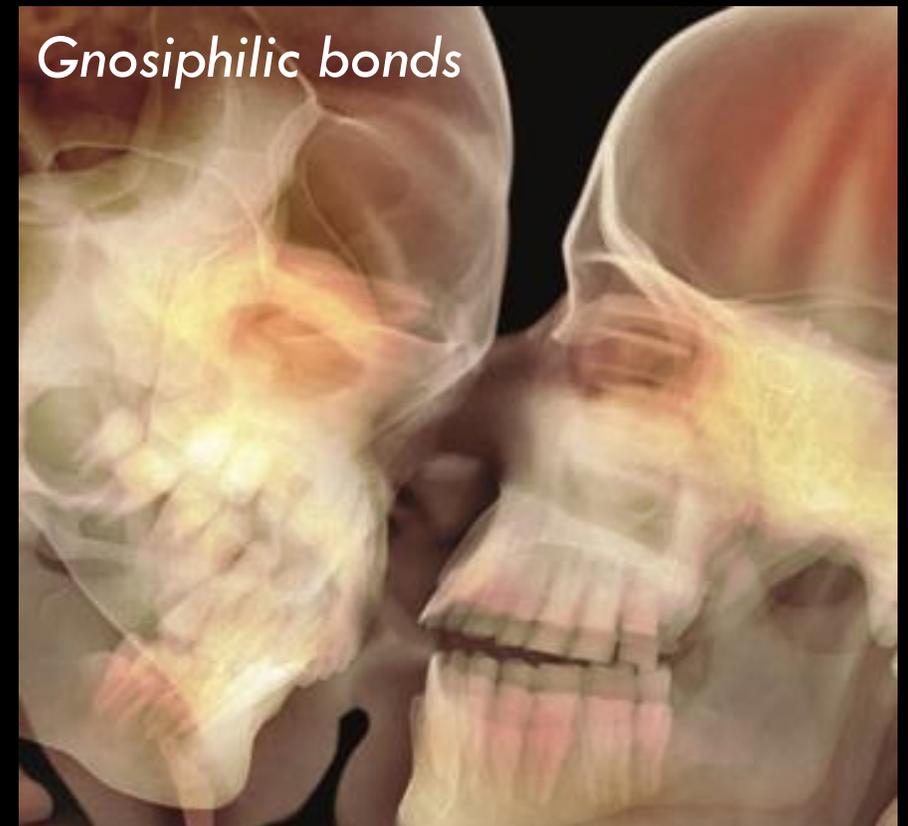
Plesiophilic bonds



Euphilic bonds



Gnosiphilic bonds



BONDS ARE ESSENTIAL



Bowlby

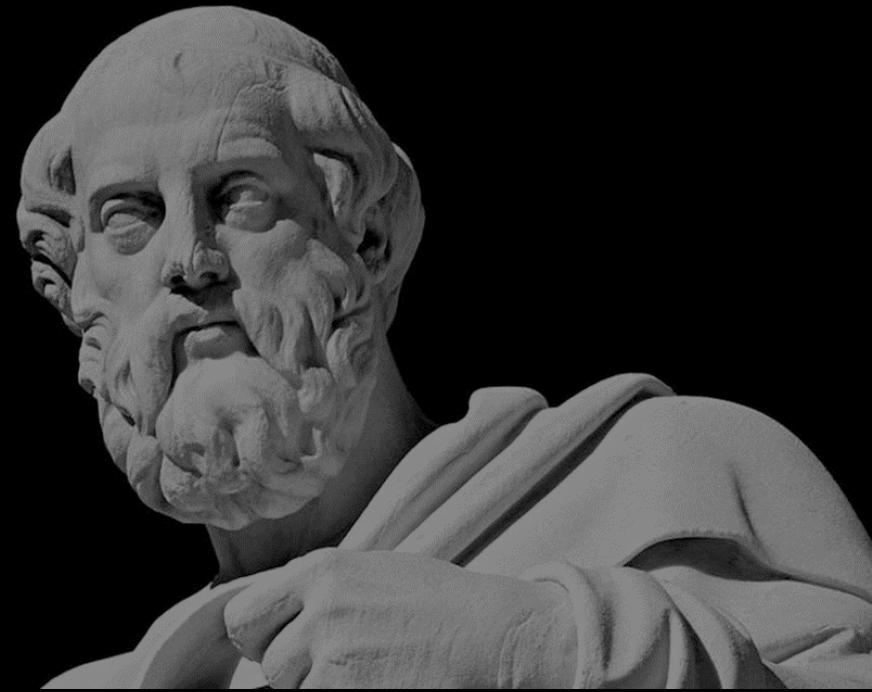


Harlow



Lorenz

BONDS ARE ESSENTIAL



Human bonds

Romantic partner

Family

Friendships

Social groups

Pair bonds

Kin bonds

Coalitions

Eros

Storge

Philia

Agape

BONDS ARE ESSENTIAL



Datong, China
1600 years ago



Andronovo family, Siberia
3500 years ago



Lovers of Valdaro, Italy
6000 years ago

The background of the slide features two human skulls in profile, facing each other. The skulls are rendered in a semi-transparent, glowing style, with the brain areas highlighted in warm colors like orange, yellow, and red, suggesting neural activity or specific brain regions. The overall aesthetic is scientific and focused on the brain.

TAKE-HOME MESSAGES

Love is an evolutionary adaptation.

- *Bonds allows partners to cooperate.*

Love and bonding share common mechanisms across species

- *Understanding bonds can reveal how love protects against stress-related disease*

There are natural differences between species, and between individuals

- *There are many ways to experience love*

ACKNOWLEDGMENTS

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