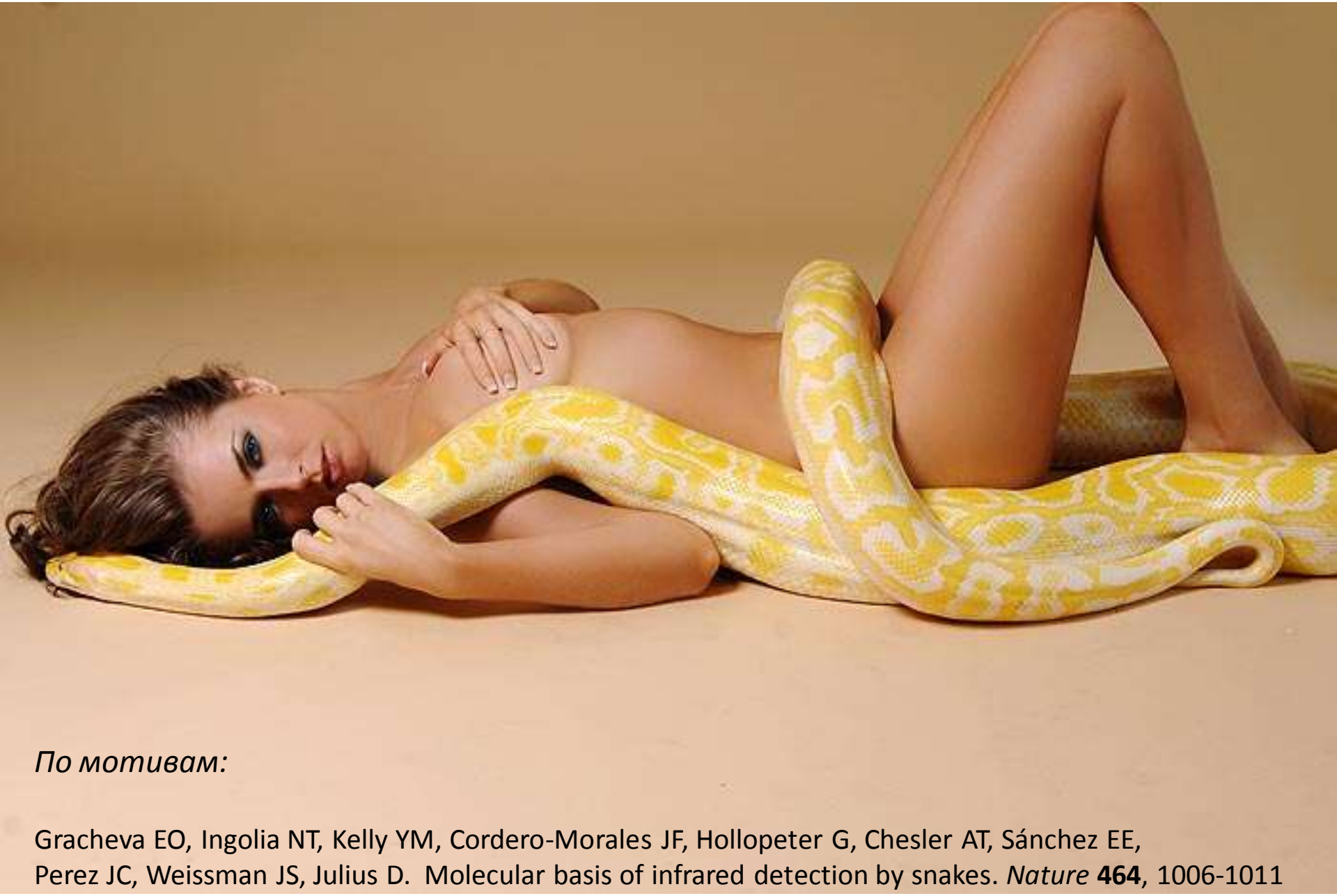
Molecular basis of infrared detection by snakes



По мотивам:

Gracheva EO, Ingolia NT, Kelly YM, Cordero-Morales JF, Hollopeter G, Chesler AT, Sánchez EE, Perez JC, Weissman JS, Julius D. Molecular basis of infrared detection by snakes. *Nature* **464**, 1006-1011

Кто?

Гремучие змейки (ямкоголовые) *Crotalinae*

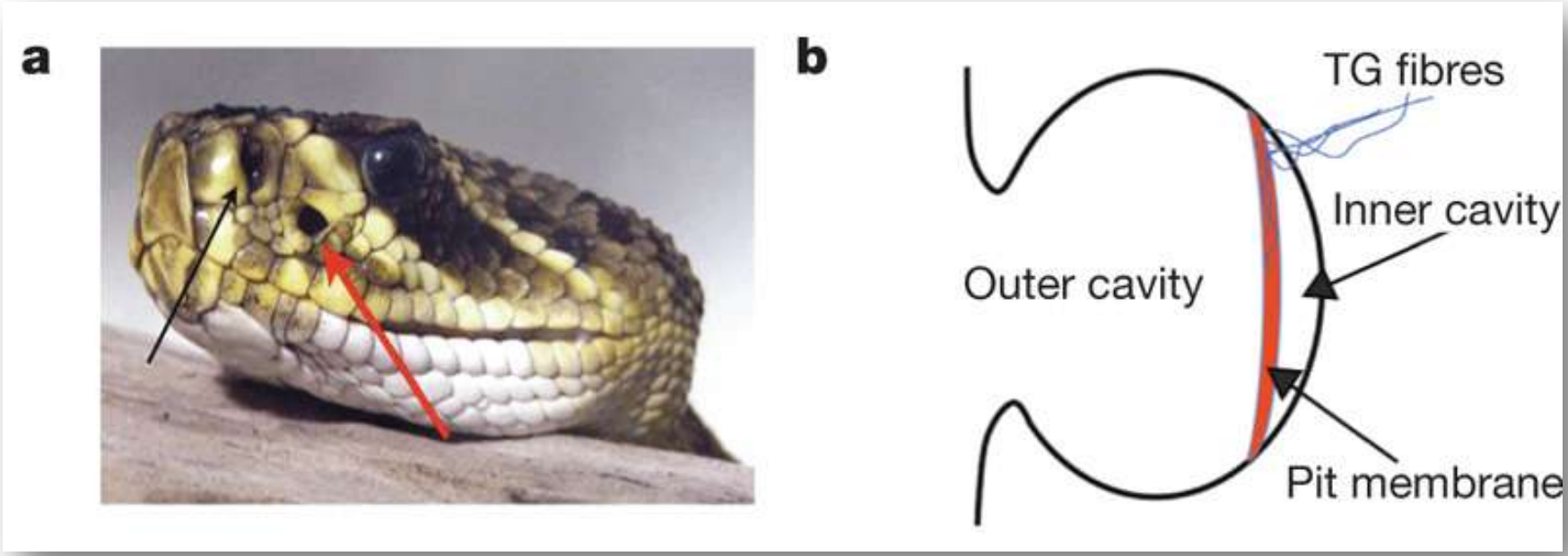
Питончики *Pithonidae*

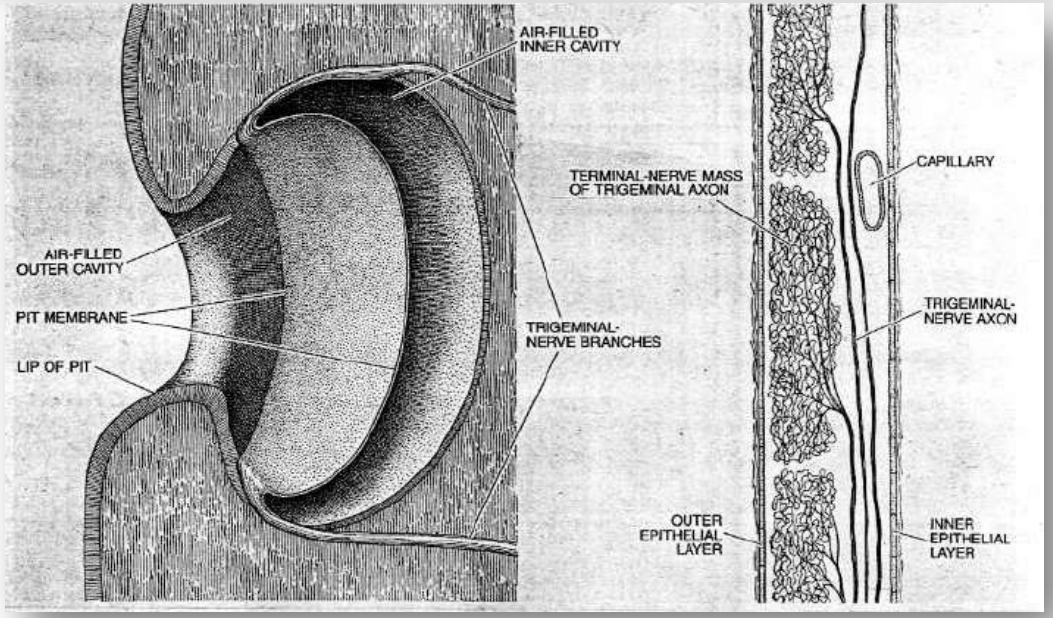
Удавчики *Boidae*

5-10 : 1

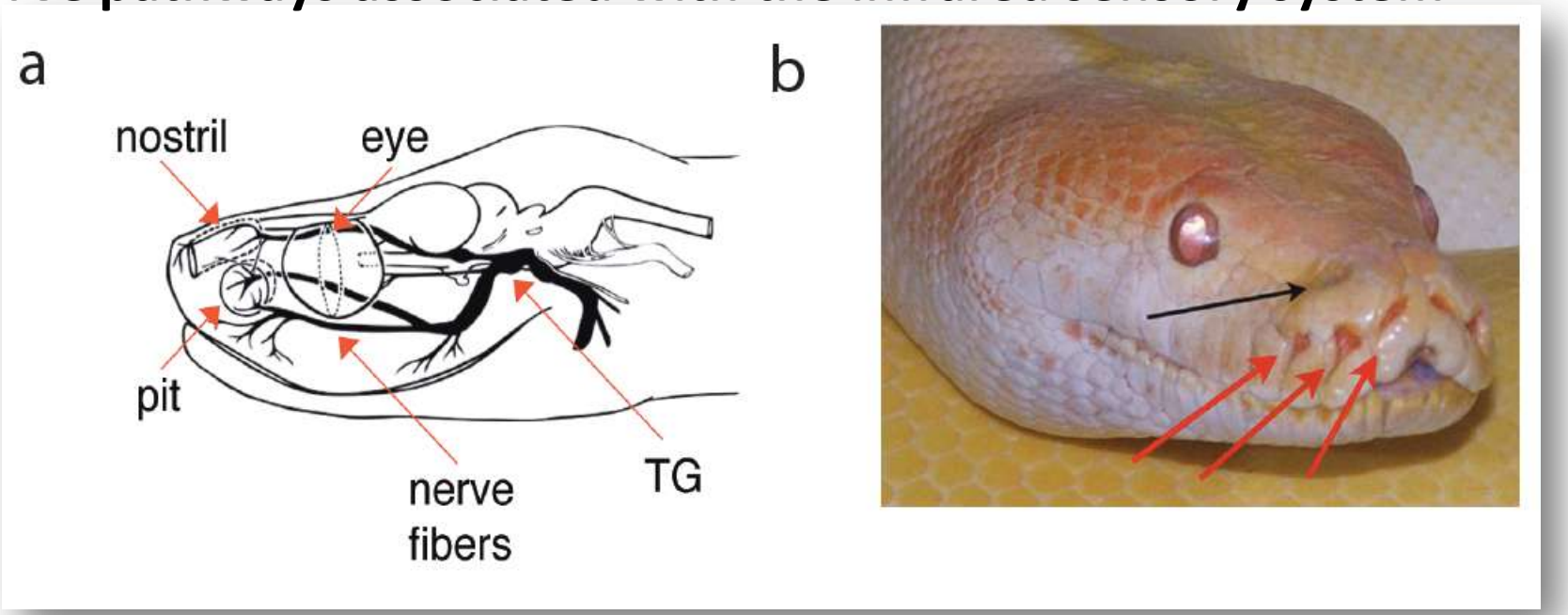
в пользу ЯМКОГОЛОВЫХ

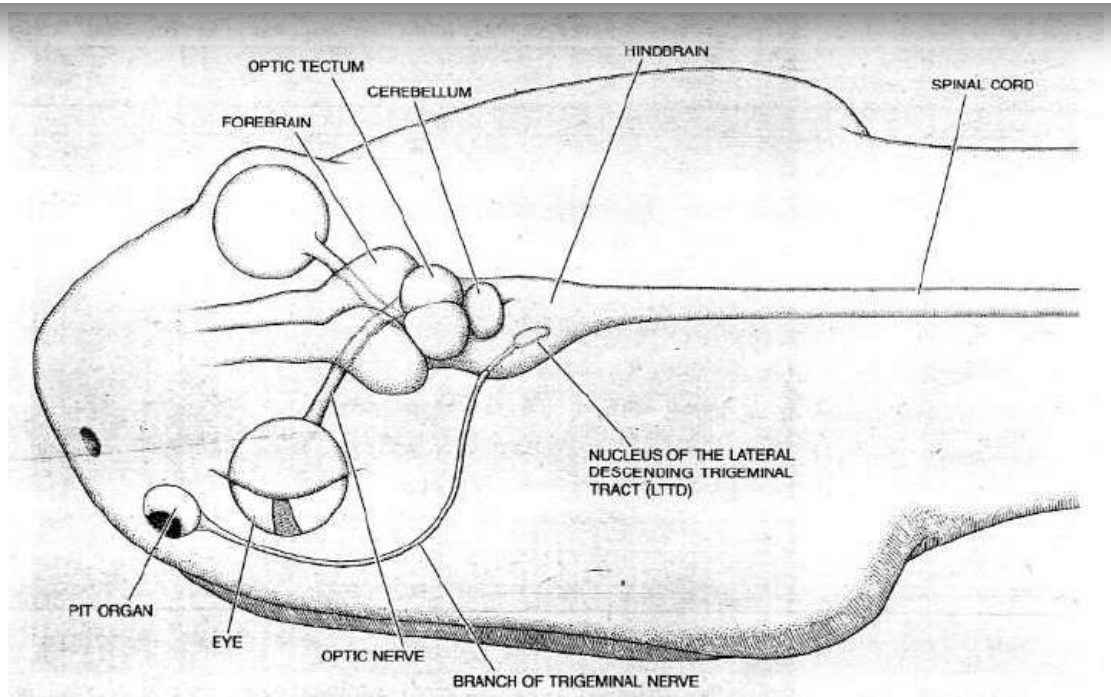
Anatomy of the pit organ



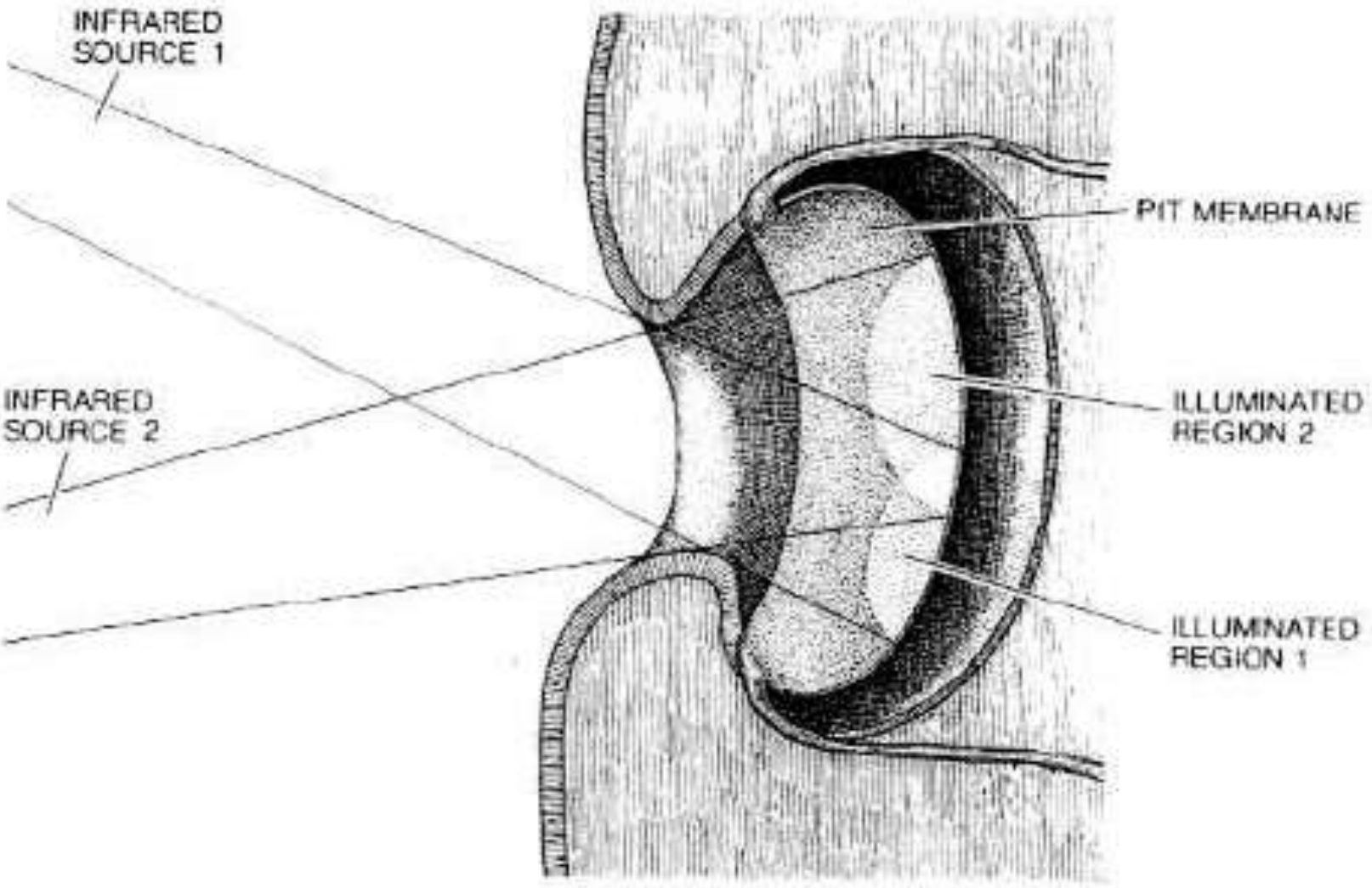


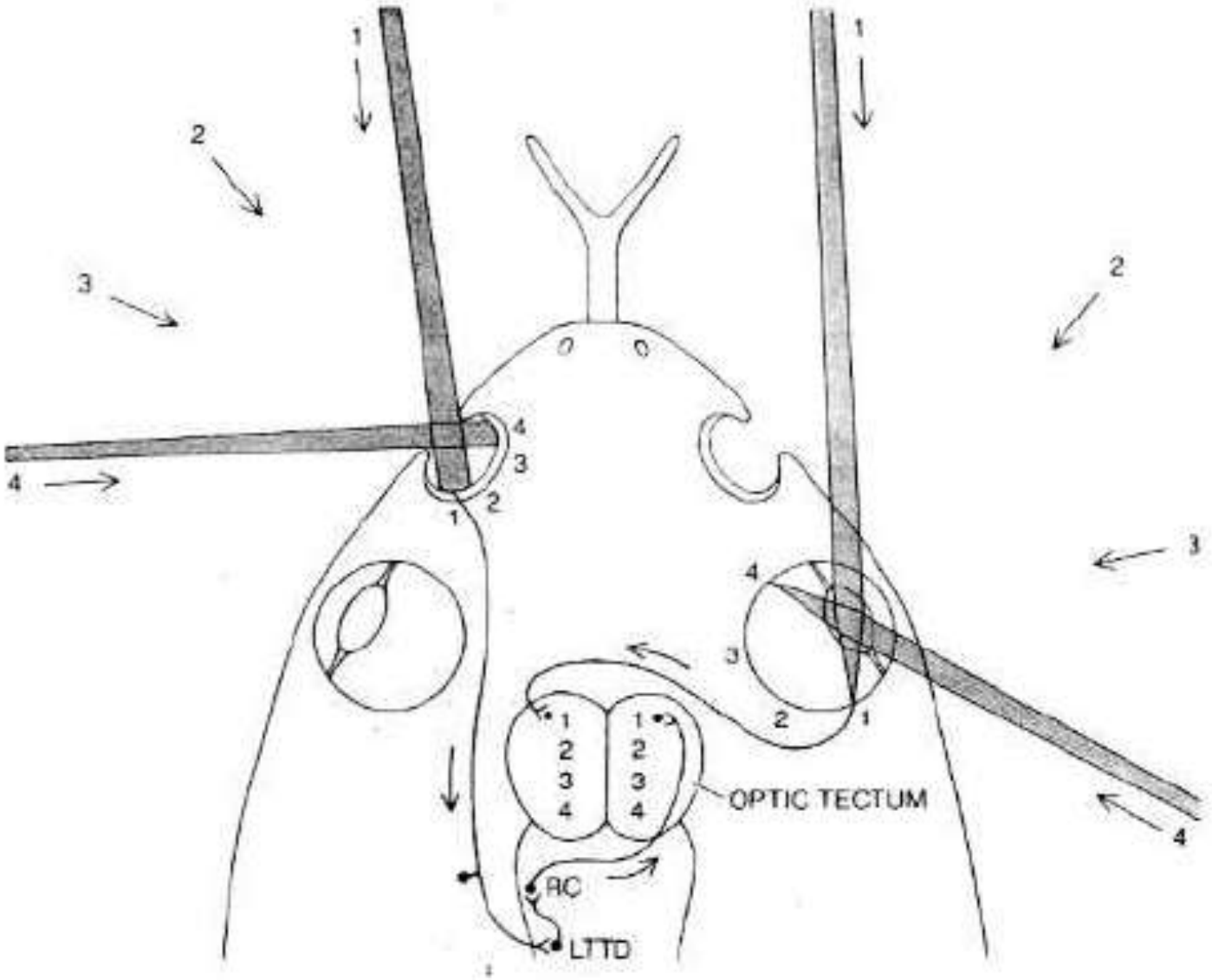
Nerve pathways associated with the infrared sensory system





Принцип


INFRARED
SOURCE 1
INFRARED
SOURCE 2
PIT MEMBRANE
ILLUMINATED
REGION 2
ILLUMINATED
REGION 1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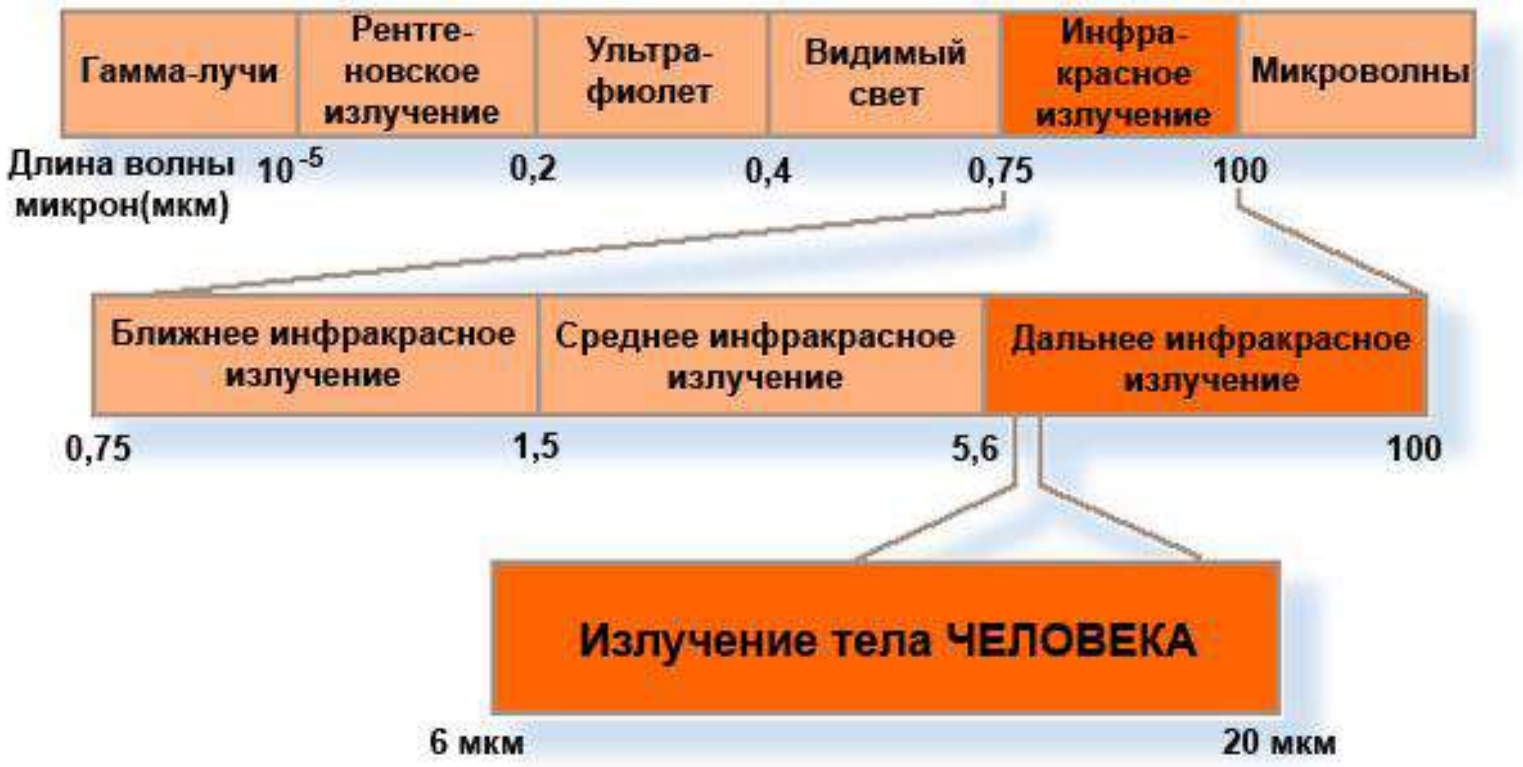
Несколько слов об ЭТОМ



Идея1:

Photons or Heat

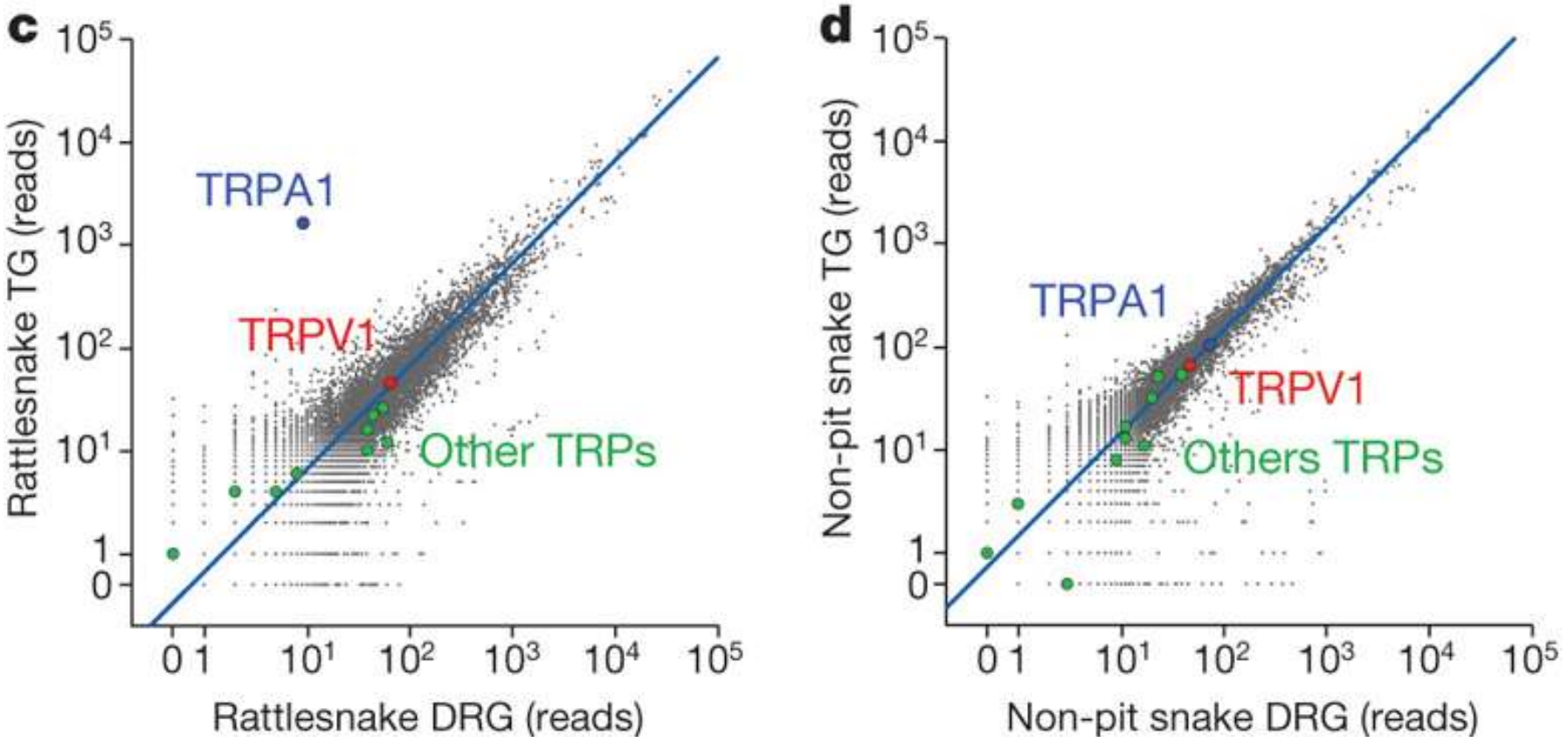
There are NO opsin-like sequences in TG of any snake species examined

Heat-activated membrane currents in TG have been described

Heat

Идея2:

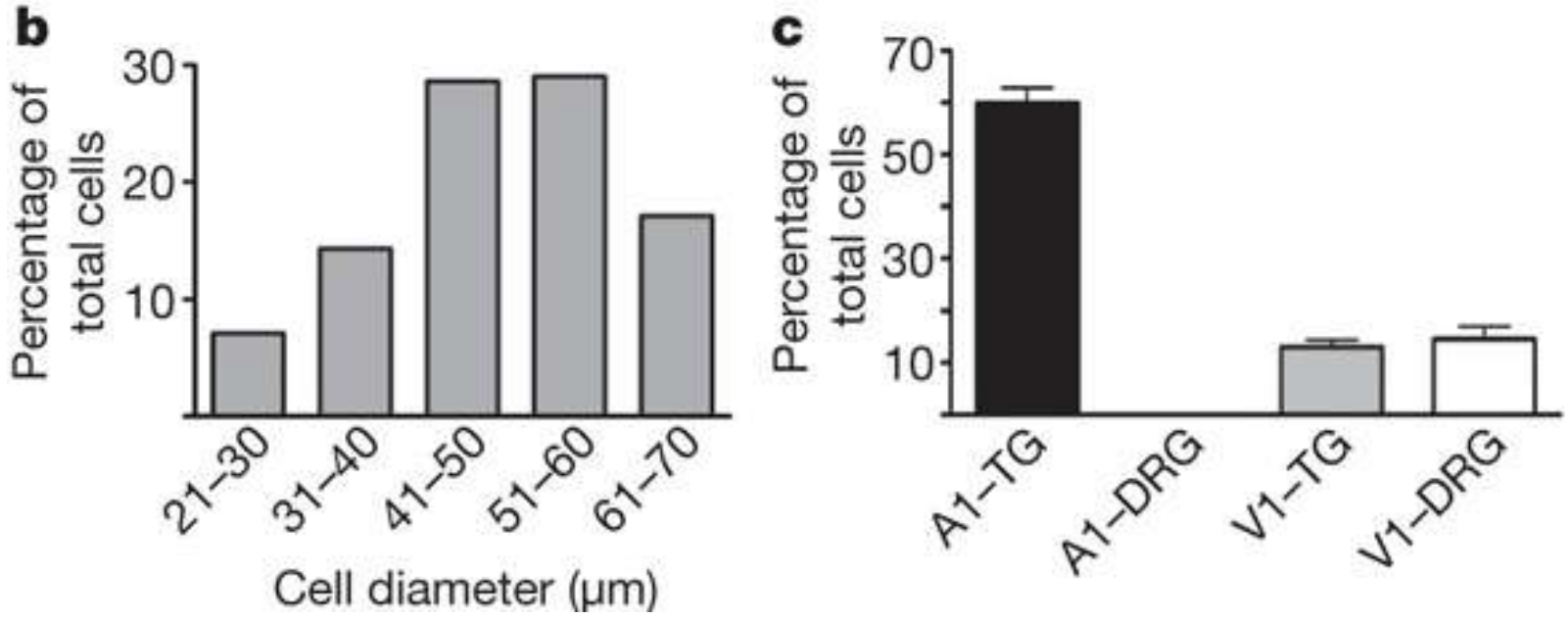
Сравним gene expression в TG и DRG



TRPA1 в 400 раз больше в TG чем в DRG

всего остального примерно поровну. ***Ничё се повезло, а!***

Копаем дальше:

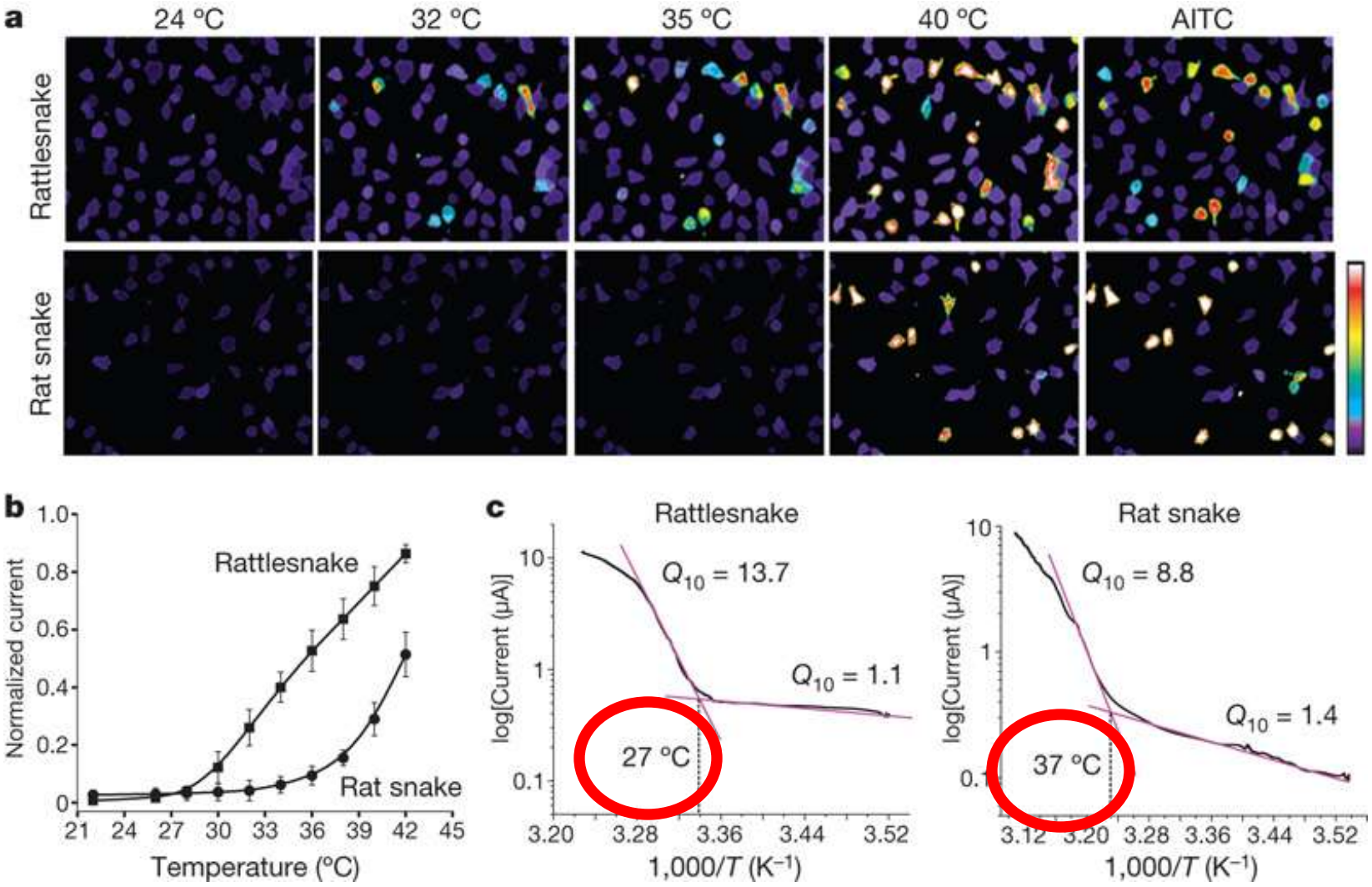


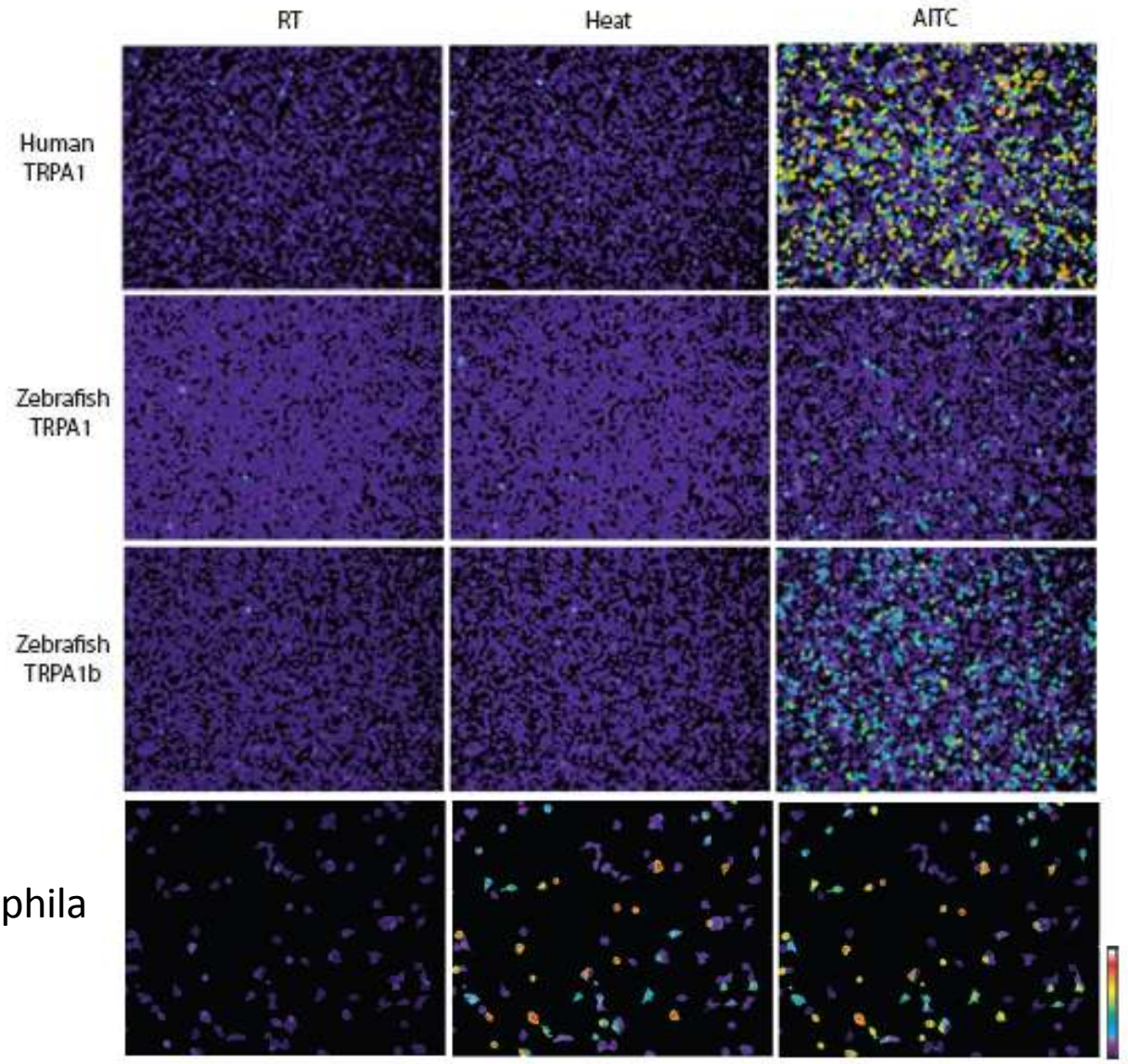
TRPA1 in mammals ~ 25% of neurones (TG or DRG)

rattlesnake ~ 60% of TG neurones (0 in DRG)

Snake TRPA1 is a heat-activated channel

In HEK





Drosophila

Ancient snakes use TRPA1 to sense infrared radiation

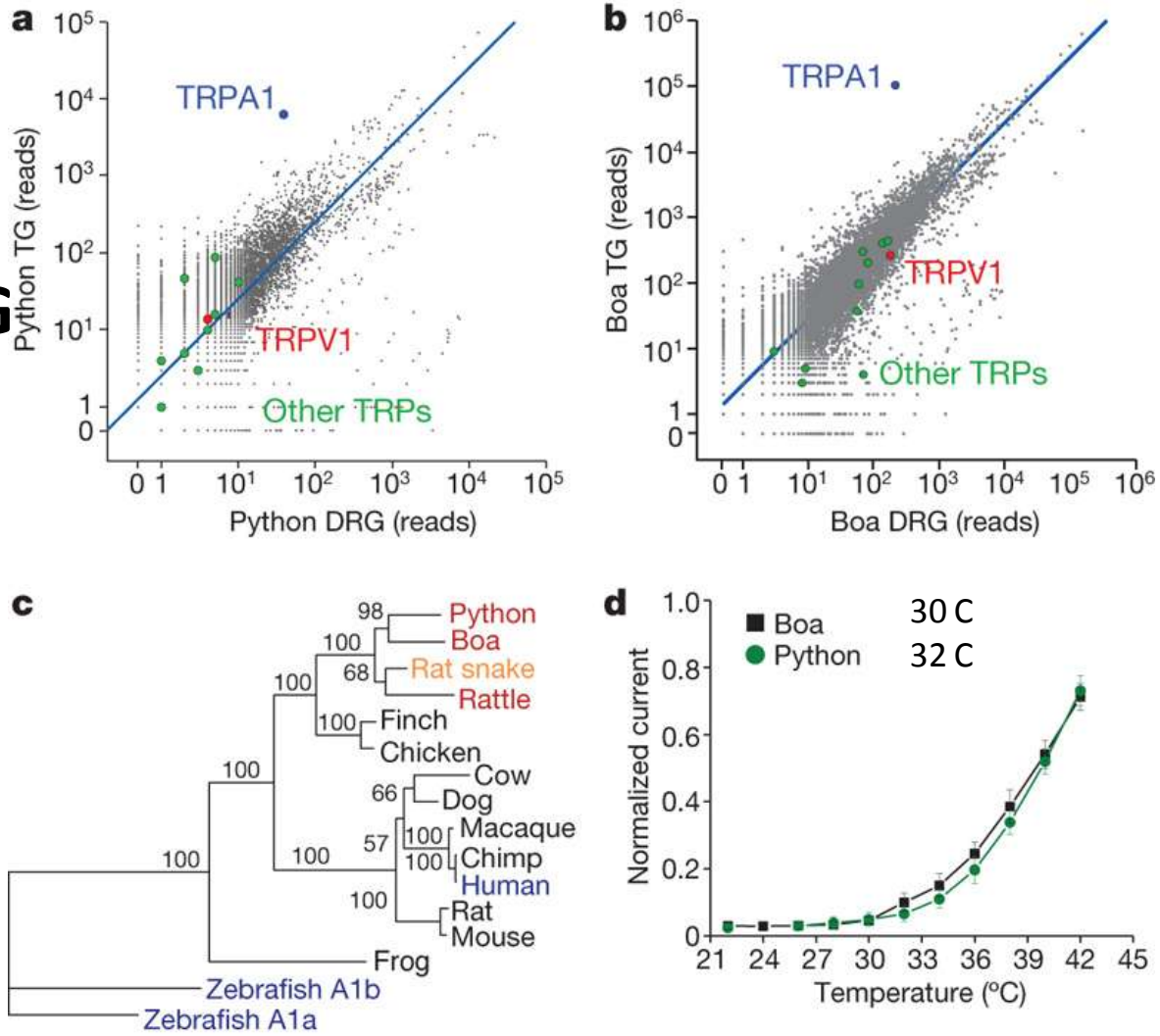
эволюция

Питоны и удавы → Гремучие змеи

> 30 млн лет

в 65 раз

TG > DRG



в 170 раз

TG > DRG

Непонятка:

"The pit sensory system is clearly functional with sensory ending temperatures well below the reported 28 °C threshold,"

Snakes can detect a human hand better in a refrigerated chamber than at room temperature


Merci beaucoup!