

Sú vtáky hlúpe?

Kognitívne schopnosti vtákov

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Burrhus Skinner

30-te roky 20. storočia

**Skinnerov box – špeciálne zariadenie
na automatické meranie učenia
zvieratá (napr. holuby) si musia
zaslúžiť odmenu (potravu v
automatickom krmidle) správnu
odpoveďou (zobanie na terčik)**



http://www.youtube.com/watch?v=I_ctJqjlrHA

**Skinnerov box používame aj my v
našej práci pri štúdiu učenia u
prepelice japonskej a kury domácej
dobrý a zlý podnet – odmena a trest**

20.04.2012 12:11:16



Vokálna komunikácia - učenie

cicavce

- človek
- slony
- delfíny
- veľryby
- netopiere

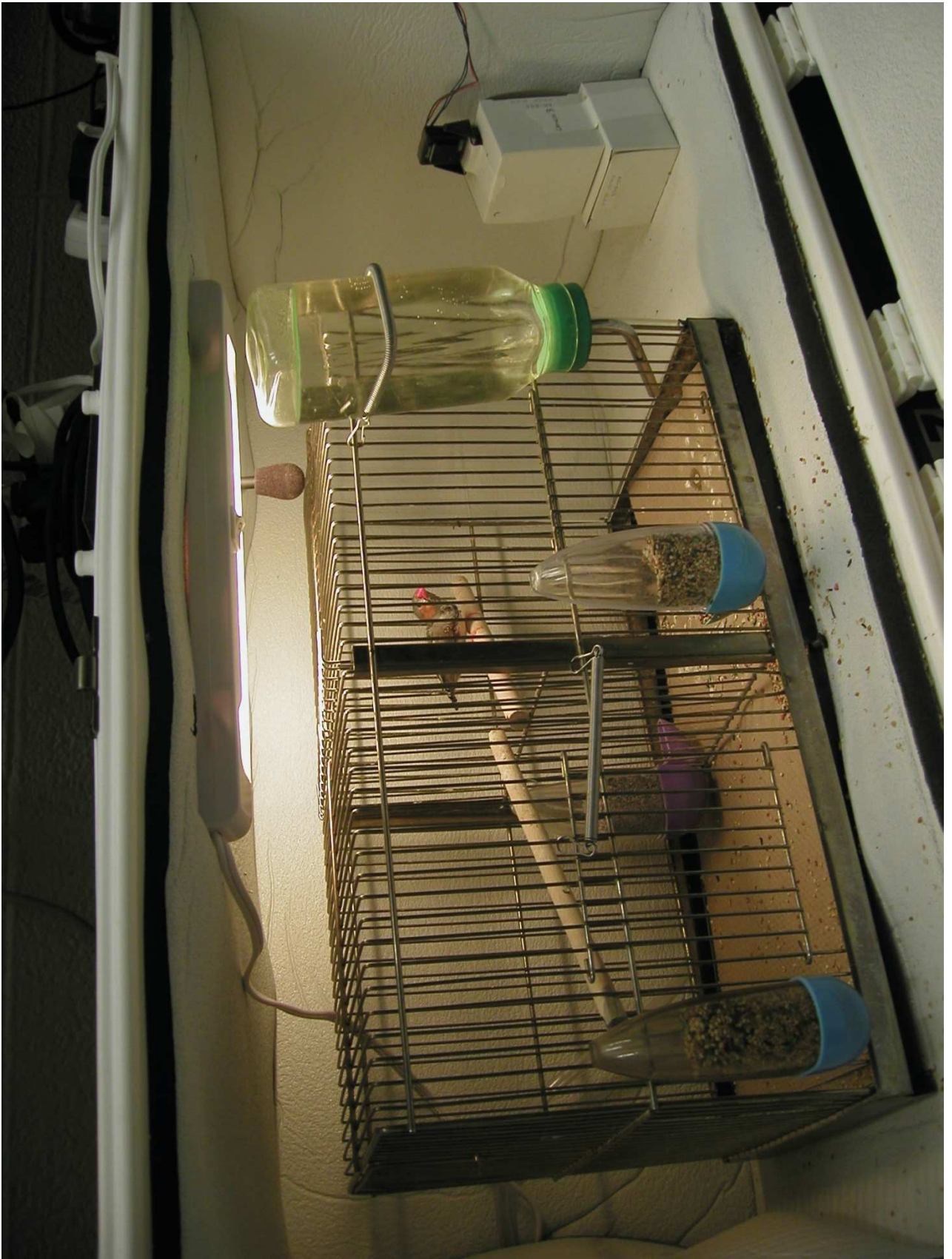
vtáky

- papagáje (rad *Psitaciformes*)
- kolibríky (rad *Apodiformes*)
- spevavce (rad *Passeriformes*)



William H. Thorpe, 50-te roky, Cambridge
základ moderného experimentálneho štúdia
spevu u spevavcov
pinka lesná

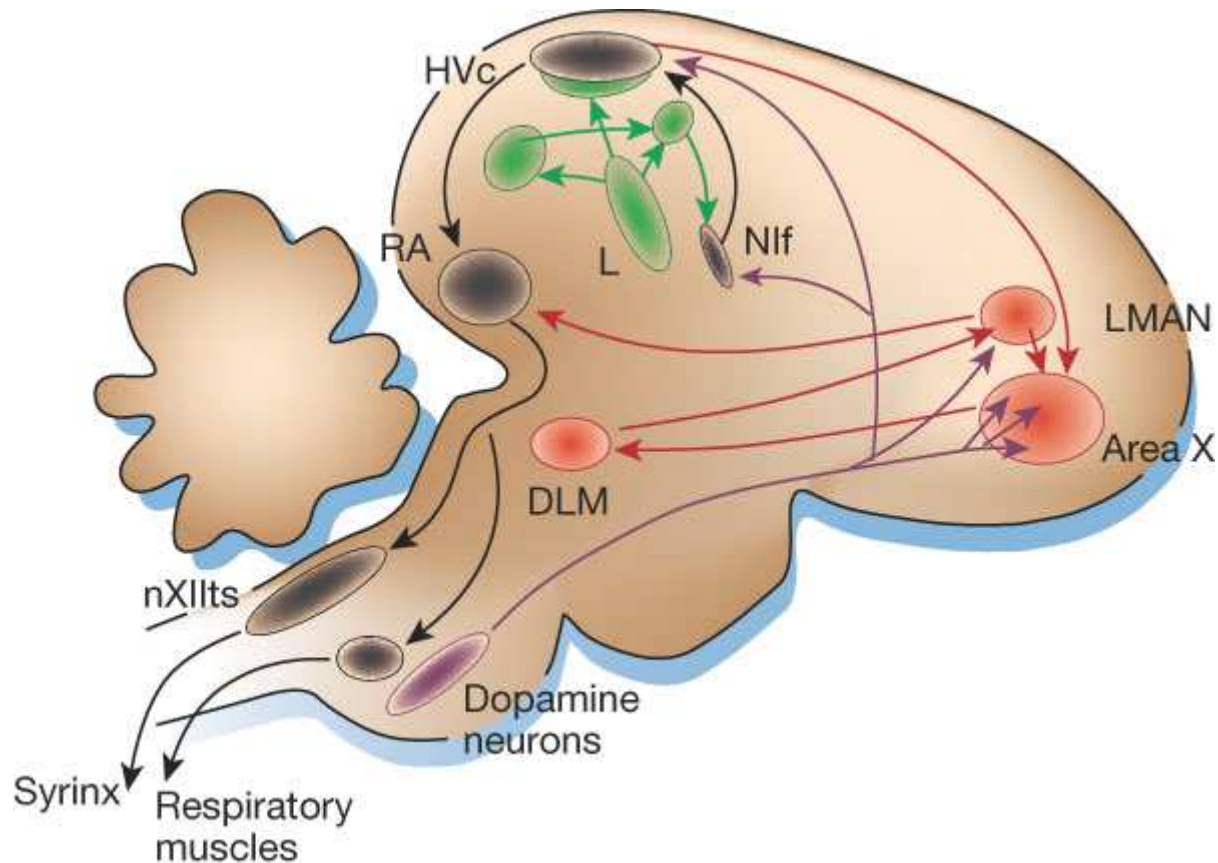




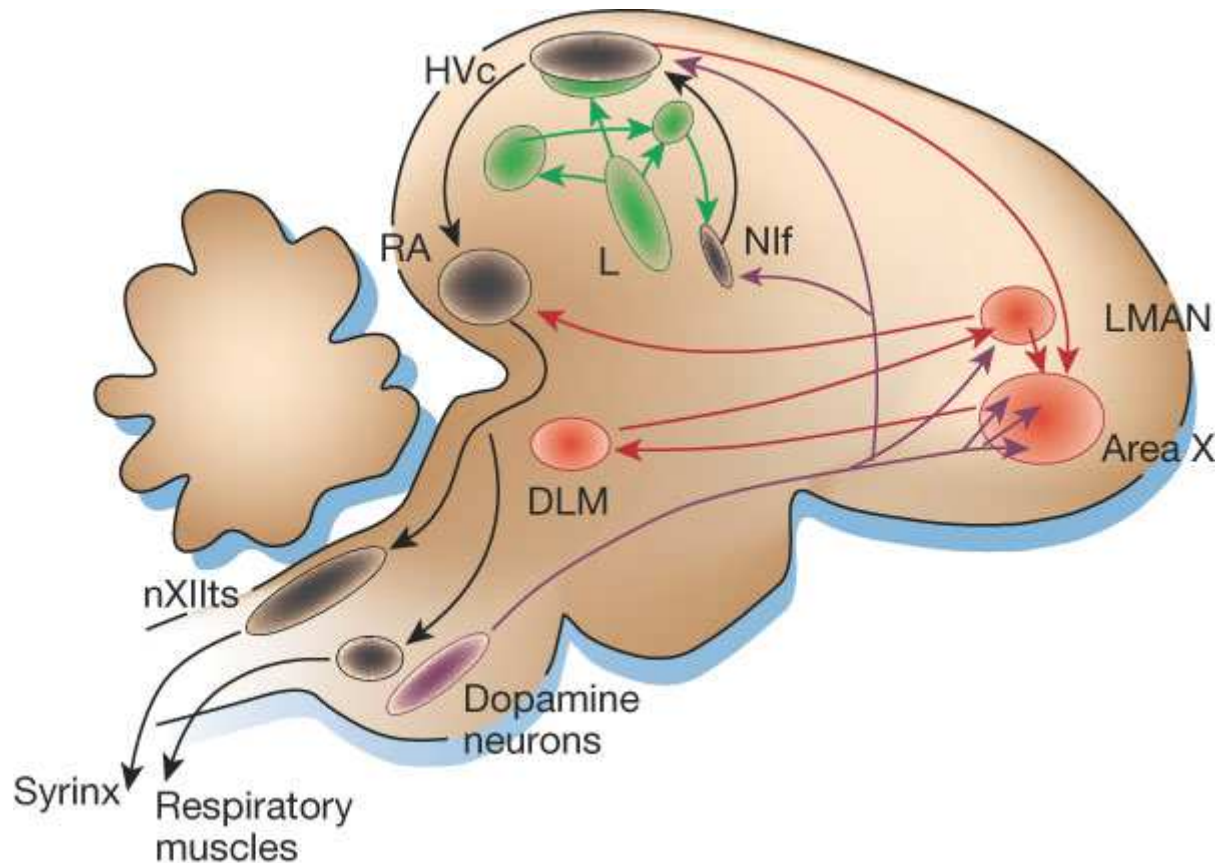


Zebrička červenozobá (*Taeniopygia guttata*)





Motorická dráha (čierna) je potrebná na normálnu produkciu spevu. Obsahuje mozgové jadrá HVC (pôvodne označované ako High Vocal Center) a *nucleus robustus arcopallii* (RA). RA sa projektuje do tracheosyringeálnej časti *nervus hypoglossus* (nXII), ktorý riadi vokálny orgán vtákov **syrinx**, a jadrá ktoré sa podieľajú na dýchaní počas spevu.

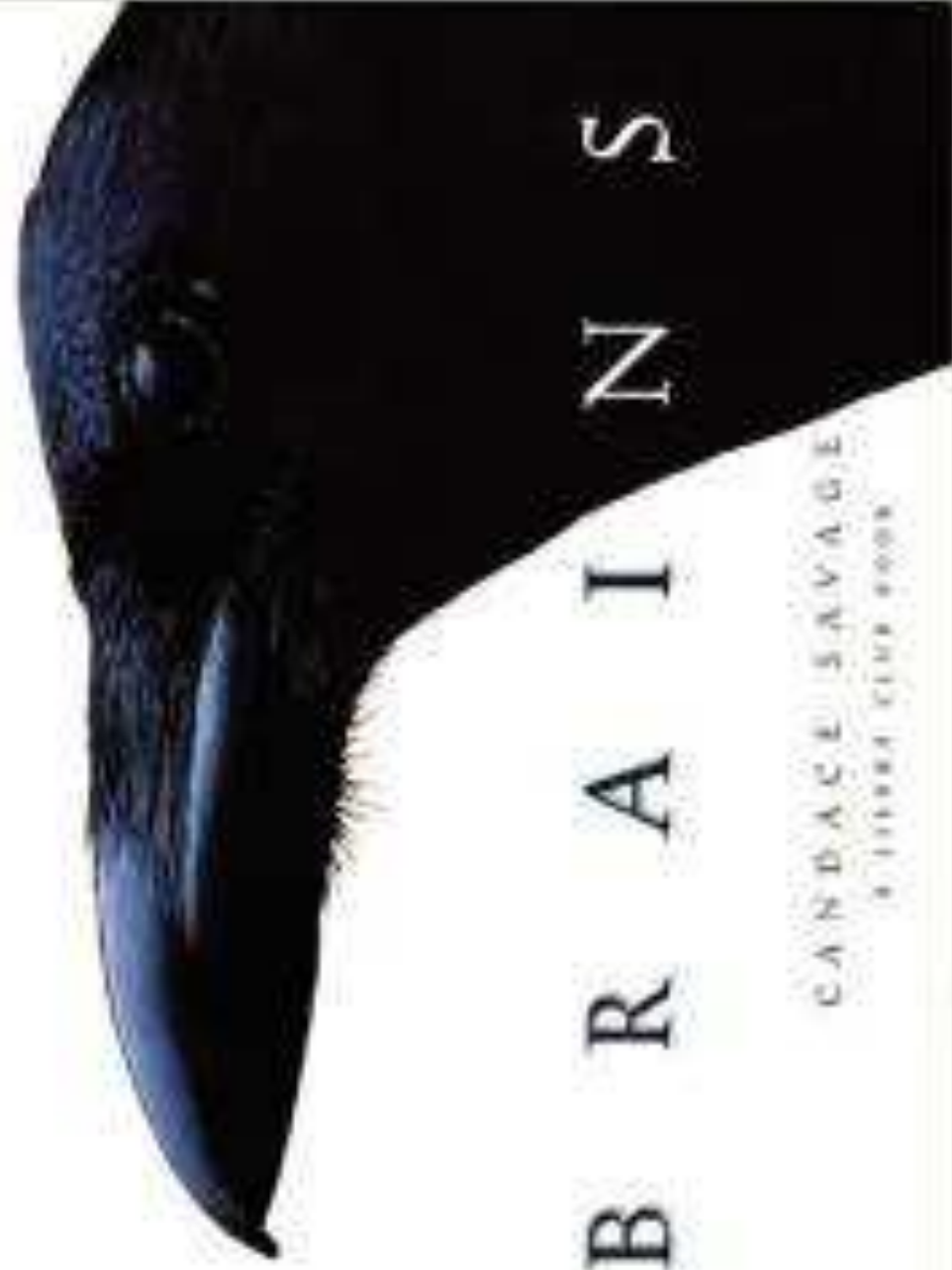


Dráha učenia (červená) alebo predná dráha (anterior forebrain pathway) zahŕňa oblasť X (Area X), jadro *nucleus lateralis magnocellularis nidopallii anterioris* (LMAN) a *nucleus dorsolateralis anterior thalami, pars medialis* (DLM). Area X je cieľom dopamínových projekcií z mezencefalu. Field L je primárna sluchová oblasť predného mozgu a projektuje sa do komplexných sietí vyšších **sluchových oblastí** (zelené).

Brainard & Doupe, 2002

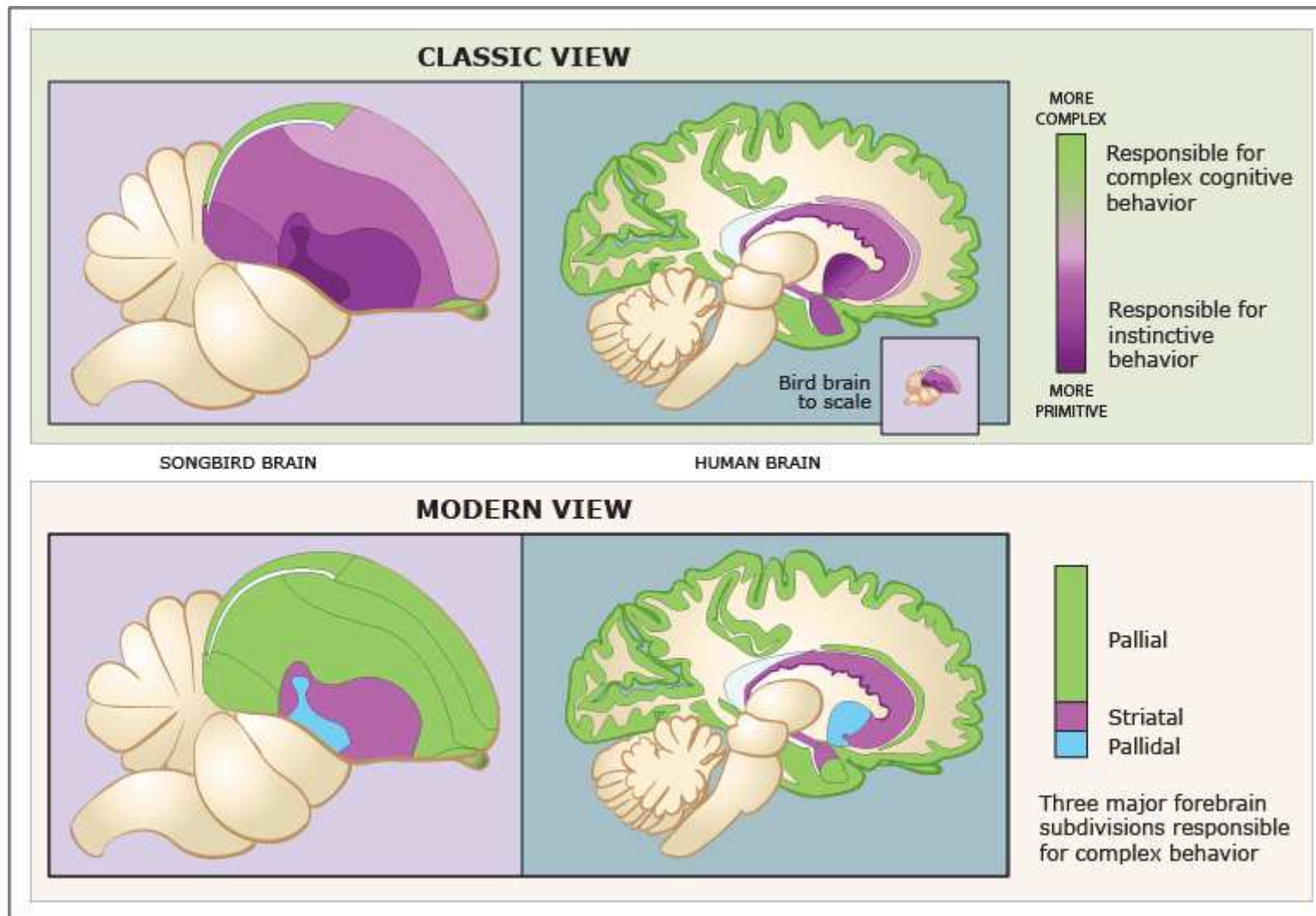
THE INTELLIGENCE OF CROWS, RAVENS, MAGPIES, AND JAYS

B I R D



B R A I N S

CANDACE SAVAGE
A TERRA CUBA BOOK



Reiner et al. (2004) *J Comp Neurol* **473**, 377-414
 Jarvis et al. (2005) *Nat Rev Neurosci* **6**, 151-159



Smarter Than Anyone Thought

Scientists have challenged the 19th-century view that areas of the brain needed for cognitive behavior did not evolve in birds and that their behavior was based largely on instinct.

OLD VIEW OF BRAIN

Most of the cerebrum was thought to consist of coils packed in clusters that were associated with instinctive behavior and that evolution did not provide the layers of flat cells, typical of mammals, needed for complex behavior.

- Associated with cognitive behavior
- Associated with instinctive behavior

CEREBRUM

CELL CLUSTERS



NEW VIEW

It is now believed that the bird's cerebrum is like that of a mammal. Complex behavior, like tool use or vocalization, arises from the interaction between higher and lower regions.

- Generates cognitive behavior
- Coordinates cognitive behavior

CEREBRUM

CELL CLUSTERS
A large area of cell clusters function like the layers of flat cells in mammals.

Interacts with the higher regions to produce complex behavior.

HOW HUMANS COMPARE

The human brain is structured so that layers of flat cells on top, interacting with clusters of cells below, are responsible for complex behavior.

FLAT CELL LAYERS

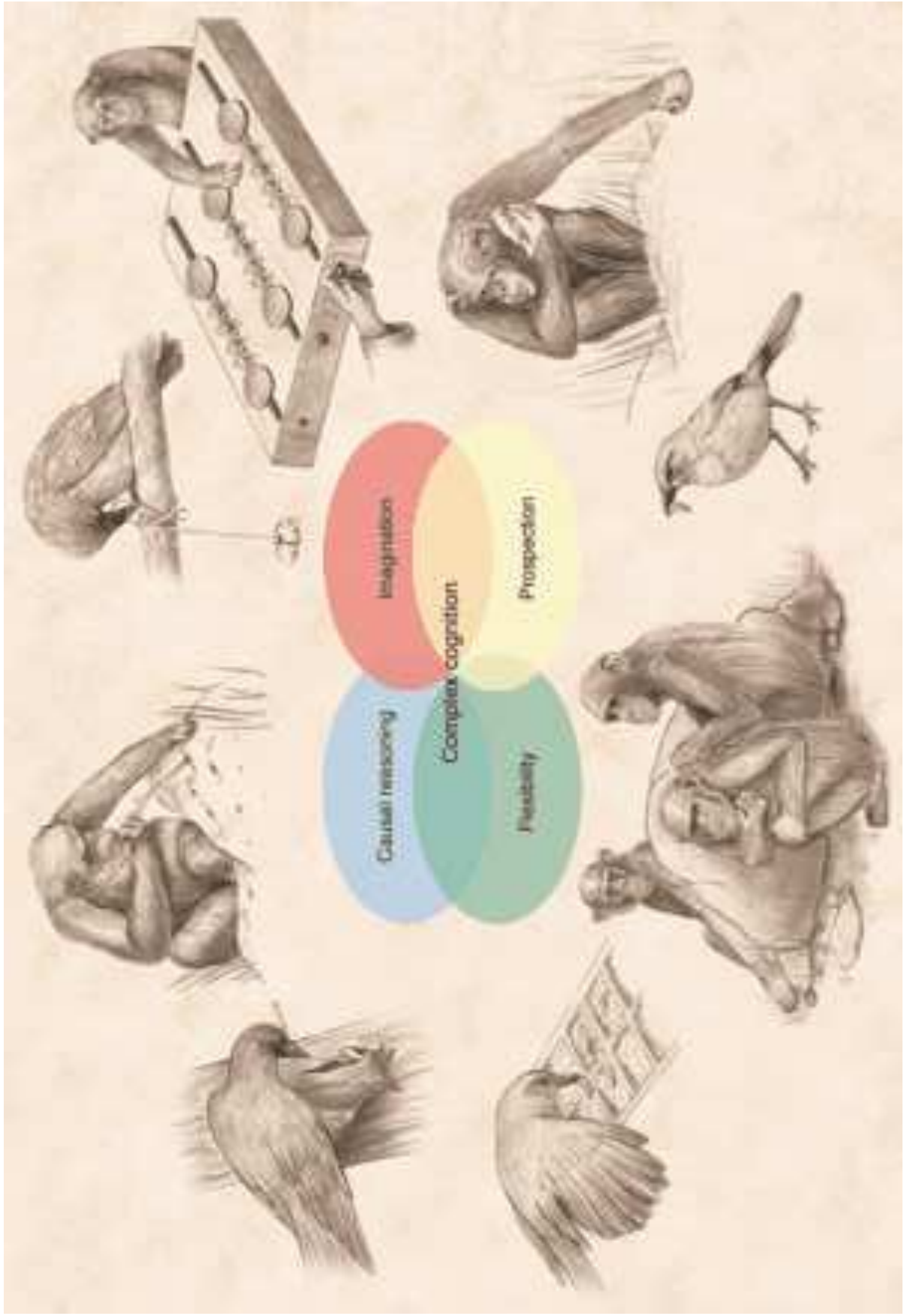
Scrubbed down to ooze



Photo/Diagram based on photo by Alan Marshall

Source: Dr. Eickel, Cornell, Duke University

- ohlasy v svetovej tlači
- New York Times
- chytřejšie ako sme si mysleli (smarter than anyone thought)





<https://www.youtube.com/watch?v=BGPGknpq3e0>

Bird Storing food for later
<https://www.youtube.com/watch?v=OPkaR0pWtks>



<https://www.youtube.com/watch?v=beZ2VedCoxw>

Alex Kacelnik, Behavioural Ecology Research Group
Department of Zoology, Oxford University

„If subordinates were sensitive to what dominants did or did not see during baiting, they should have preferentially approached and retrieved the food that dominants had not seen hidden or moved.“

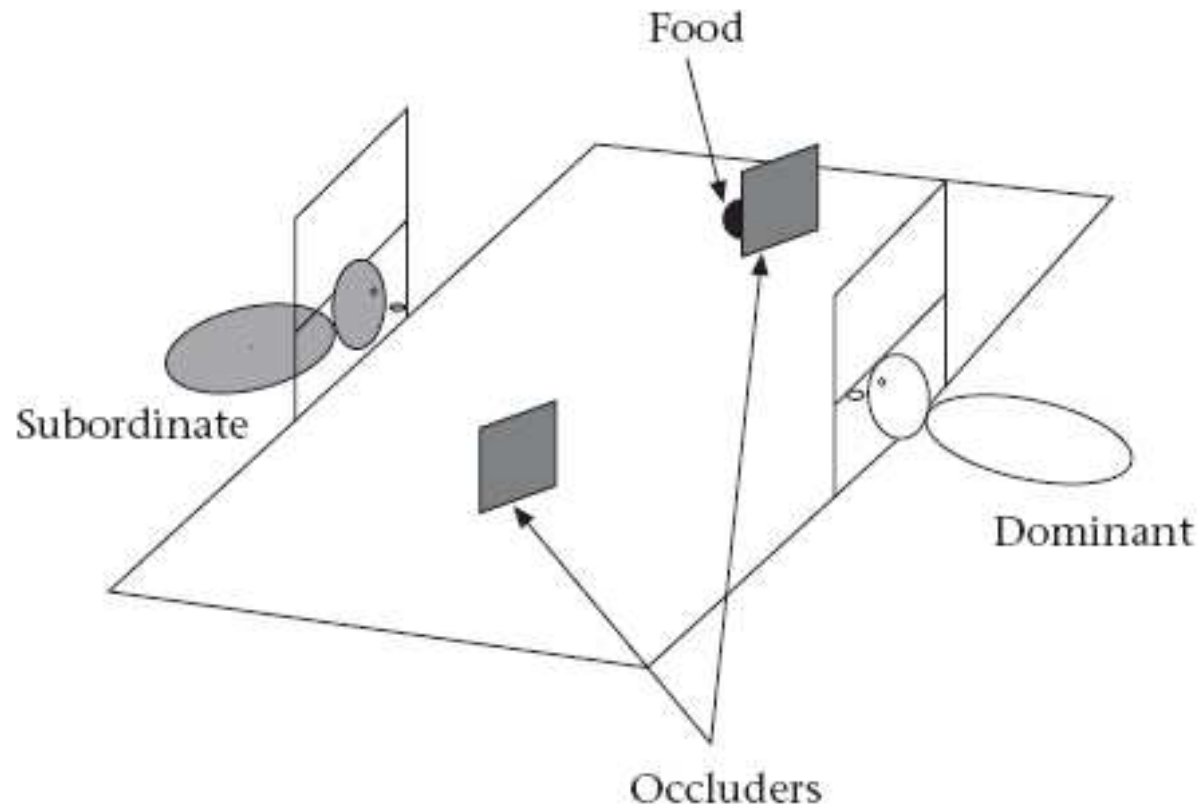


Figure 1. General experimental set-up in experiments 1–3.

Do chimpanzees know what conspecifics know?

Animal Behaviour, Volume 61, Issue 1, January 2001, Pages 139-151

Brian Hare, Josep Call, Michael Tomasello

Chimpanzees know what conspecifics do and do not see

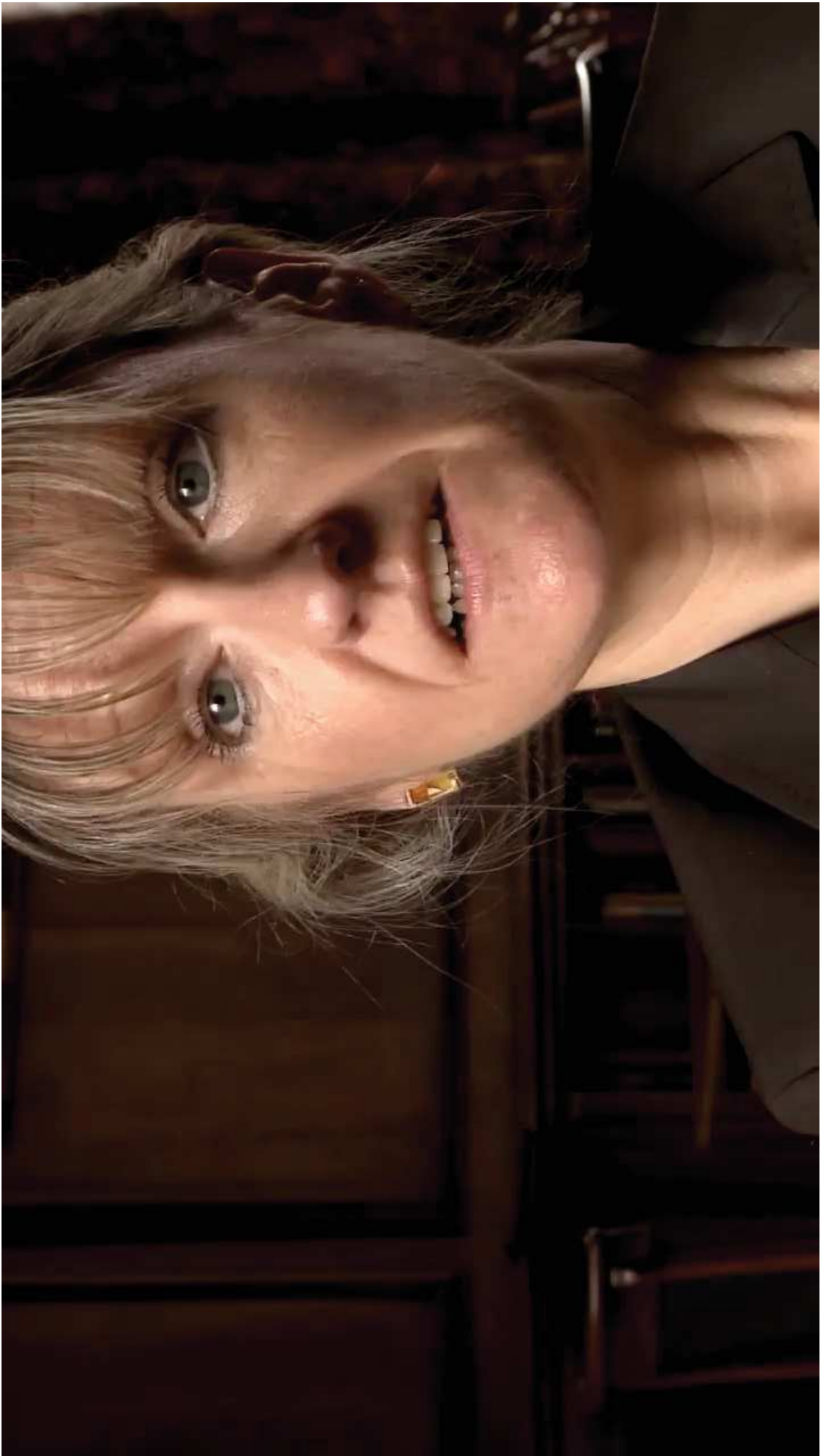
Animal Behaviour, Volume 59, Issue 4, April 2000, Pages 771-785

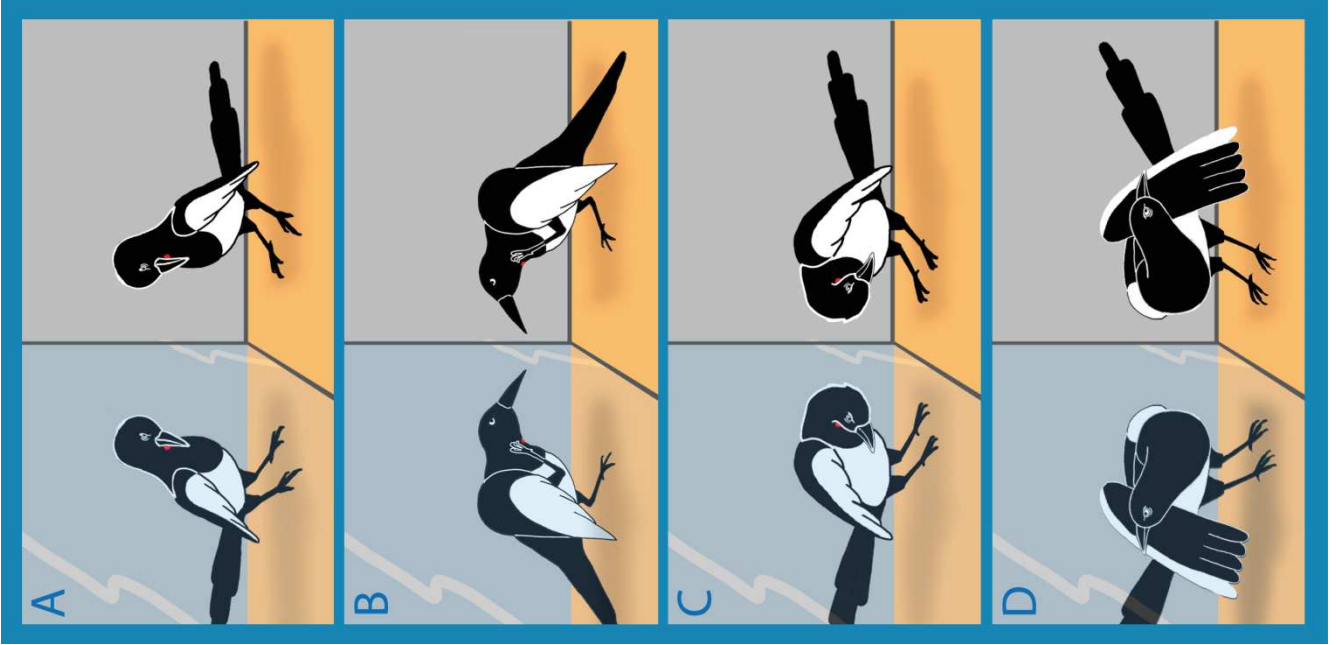
Brian Hare, Josep Call, Bryan Agnetta, Michael Tomasello

Teória mysle u sojok



Nicola S. Clayton,
Department of Experimental Psychology
University of Cambridge







Majú zvieratá zmysel pre spravodlivosť?

<https://www.youtube.com/watch?v=gOtIN4pNArk>



Frans de Waal – holandský primatológ a etológ

- v tomto roku potvrdené podobné javy u vrán a krkavcov

Figure 1. Photo of the experimental setup.



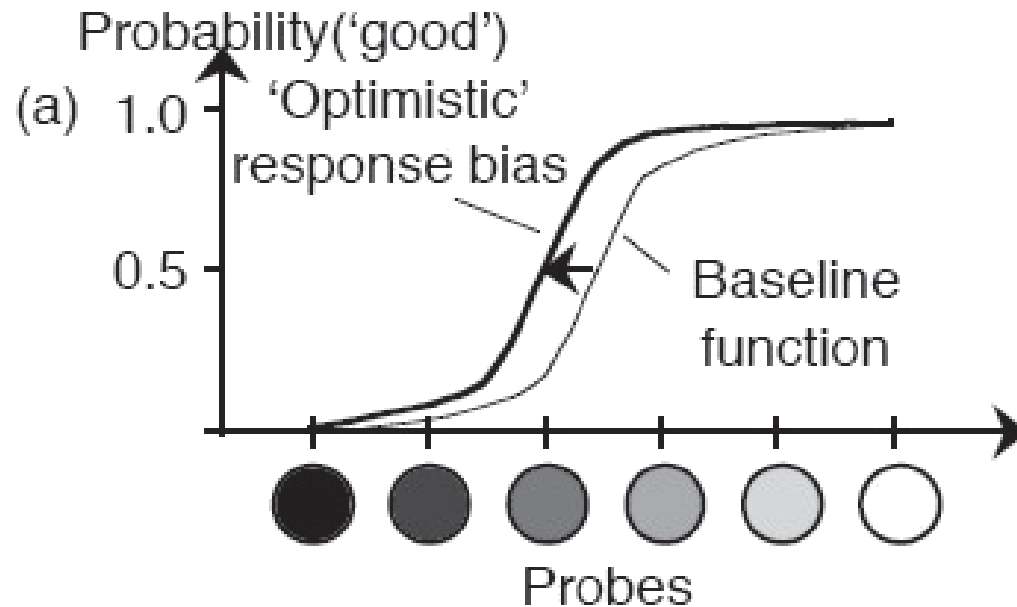
Wascher CAF, Bugnyar T (2013) Behavioral Responses to Inequity in Reward Distribution and Working Effort in Crows and Ravens. PLoS ONE 8(2): e56885. doi:10.1371/journal.pone.0056885
<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0056885>

Ďalšie témy skúmané na
oddelení fyziológie a etológie
ÚBGŽ SAV na aviárnych
modeloch

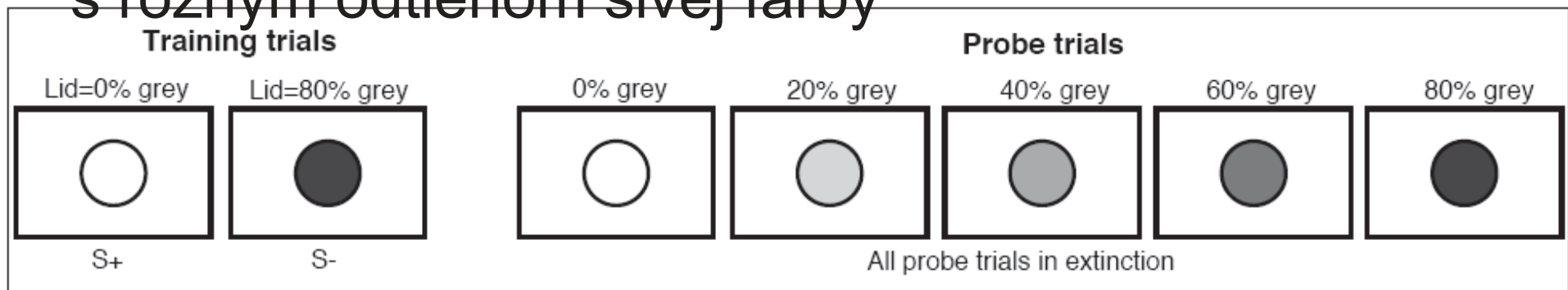
Ako sa pýtať zvierat na ich pocity?



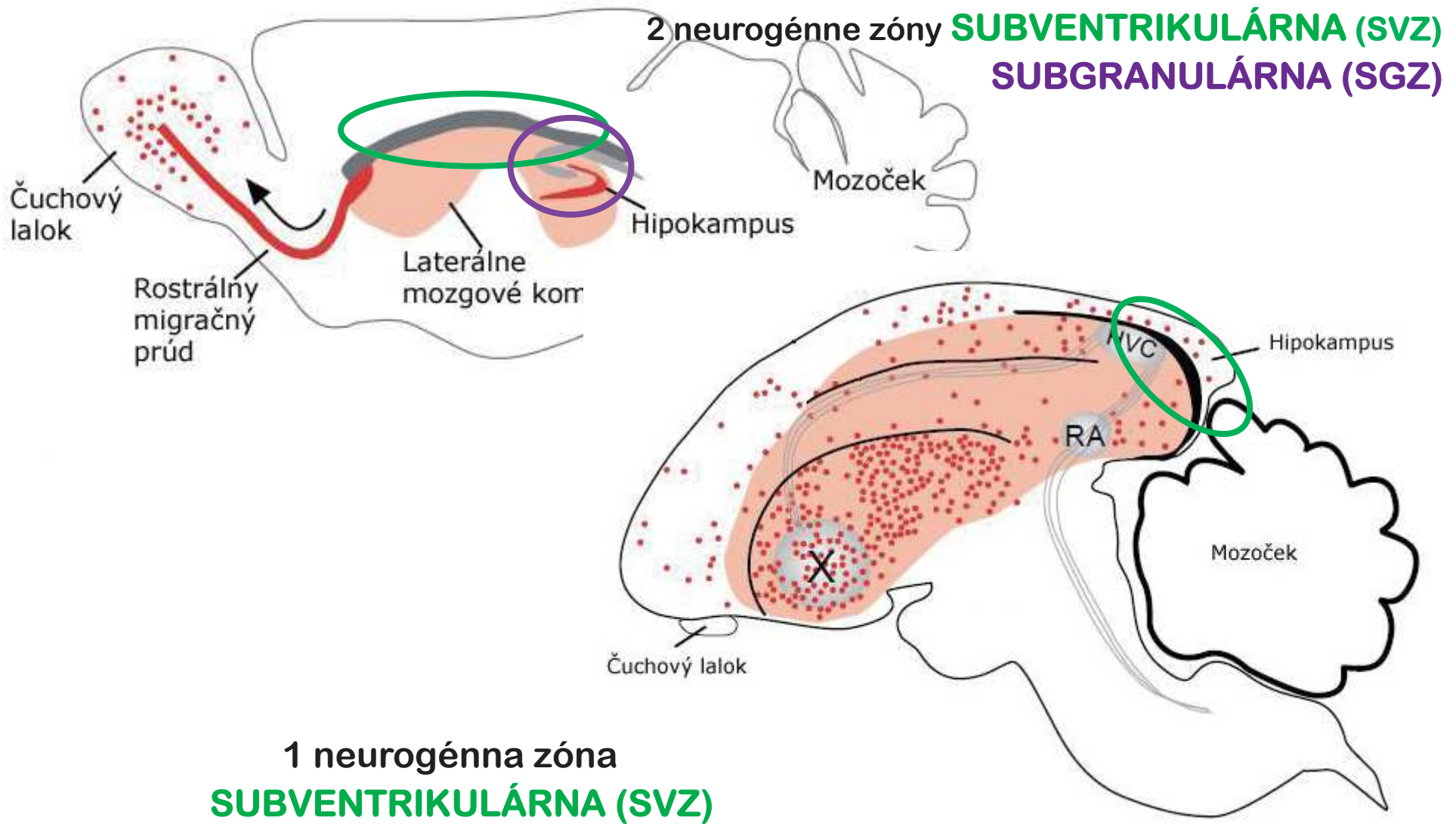
- optimista: poloplný
- pesimista: poloprázdny
- cognitive bias – skreslenie poznávania



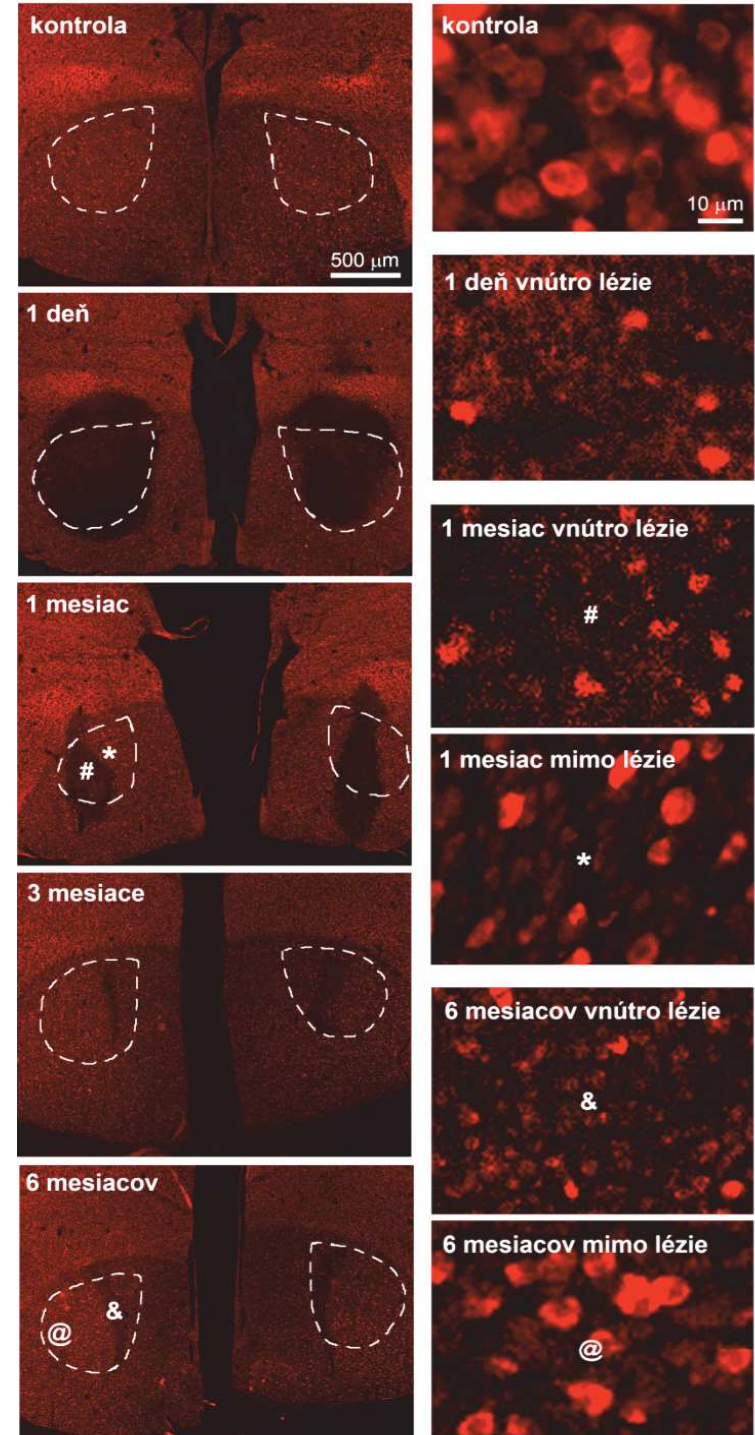
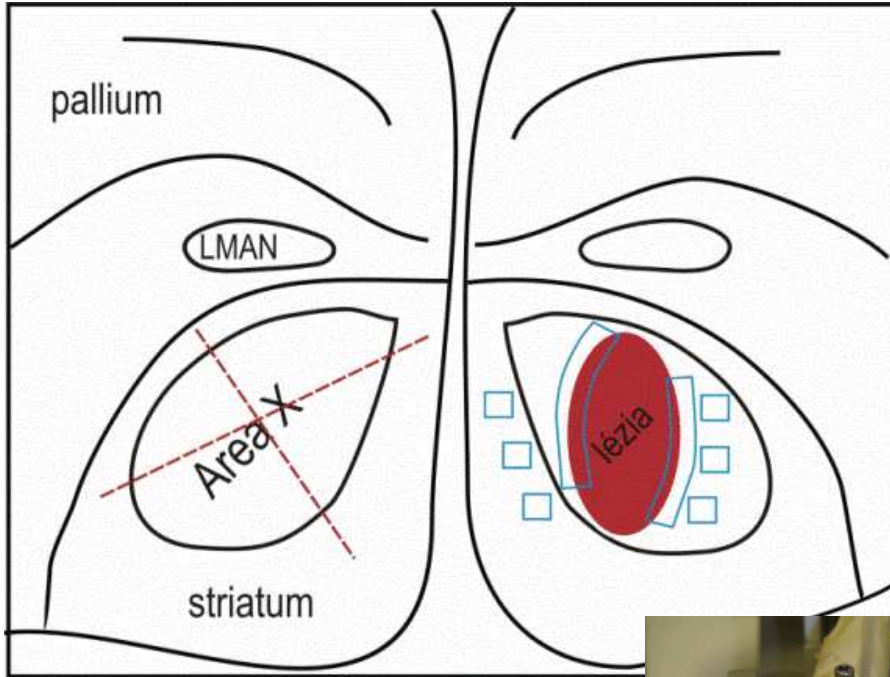
- škorce odchytené z voľnej prírody
- Petriho miska s múčnym červom prekrytá kartónom s rôznym odtieňom sivej farby



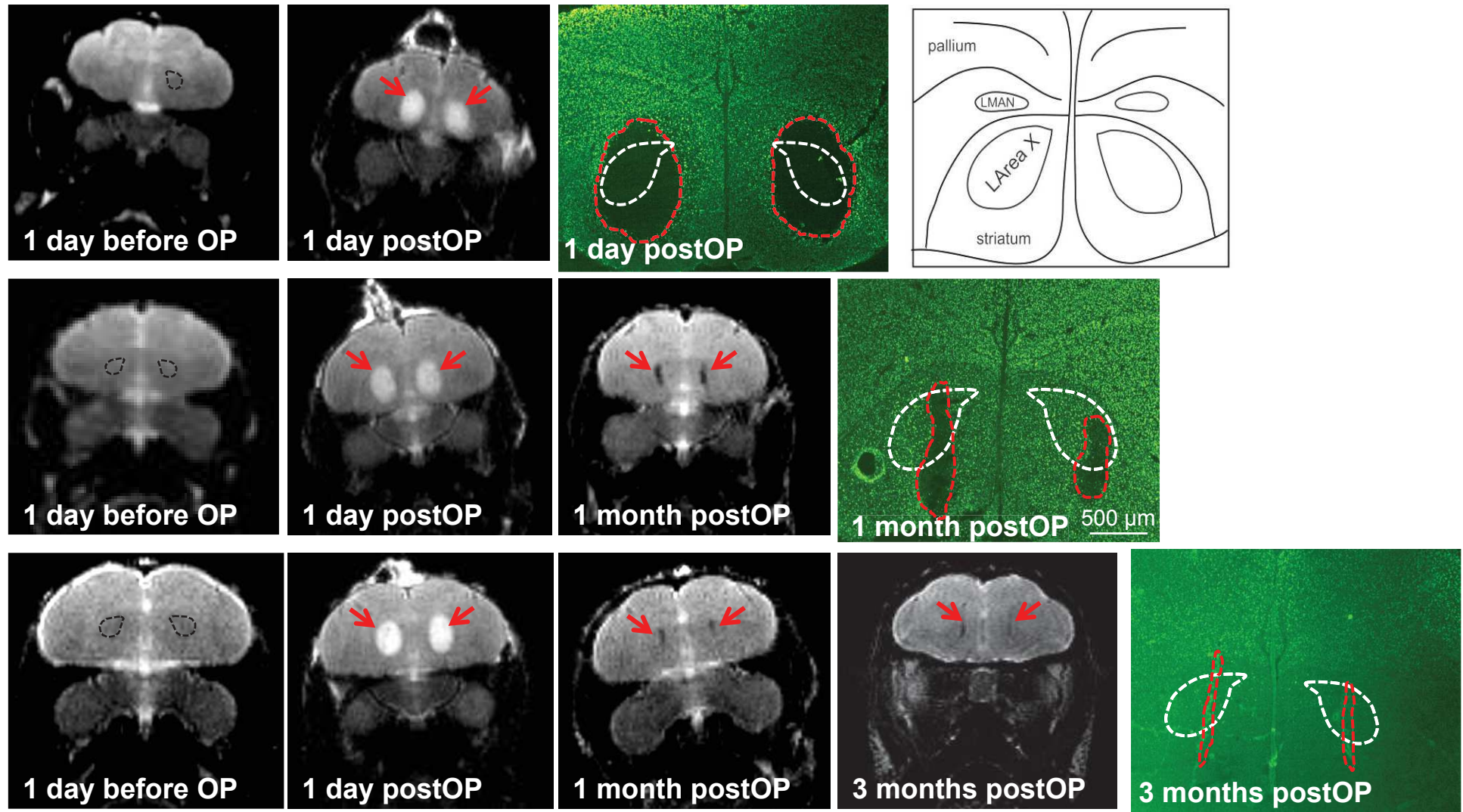
Neurogenéza

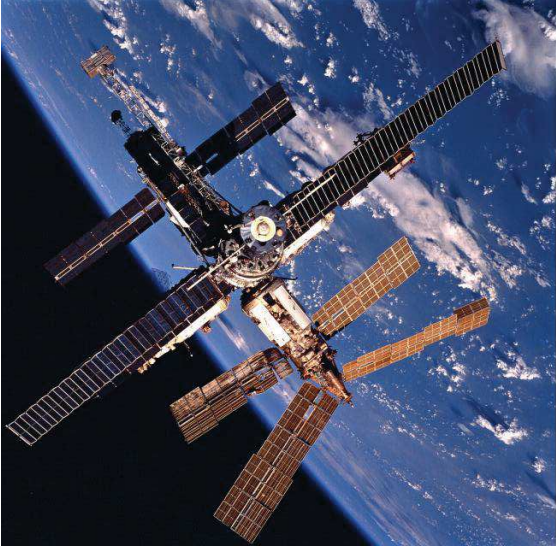


Bilaterálne lézie Area X kyselinou iboténovou



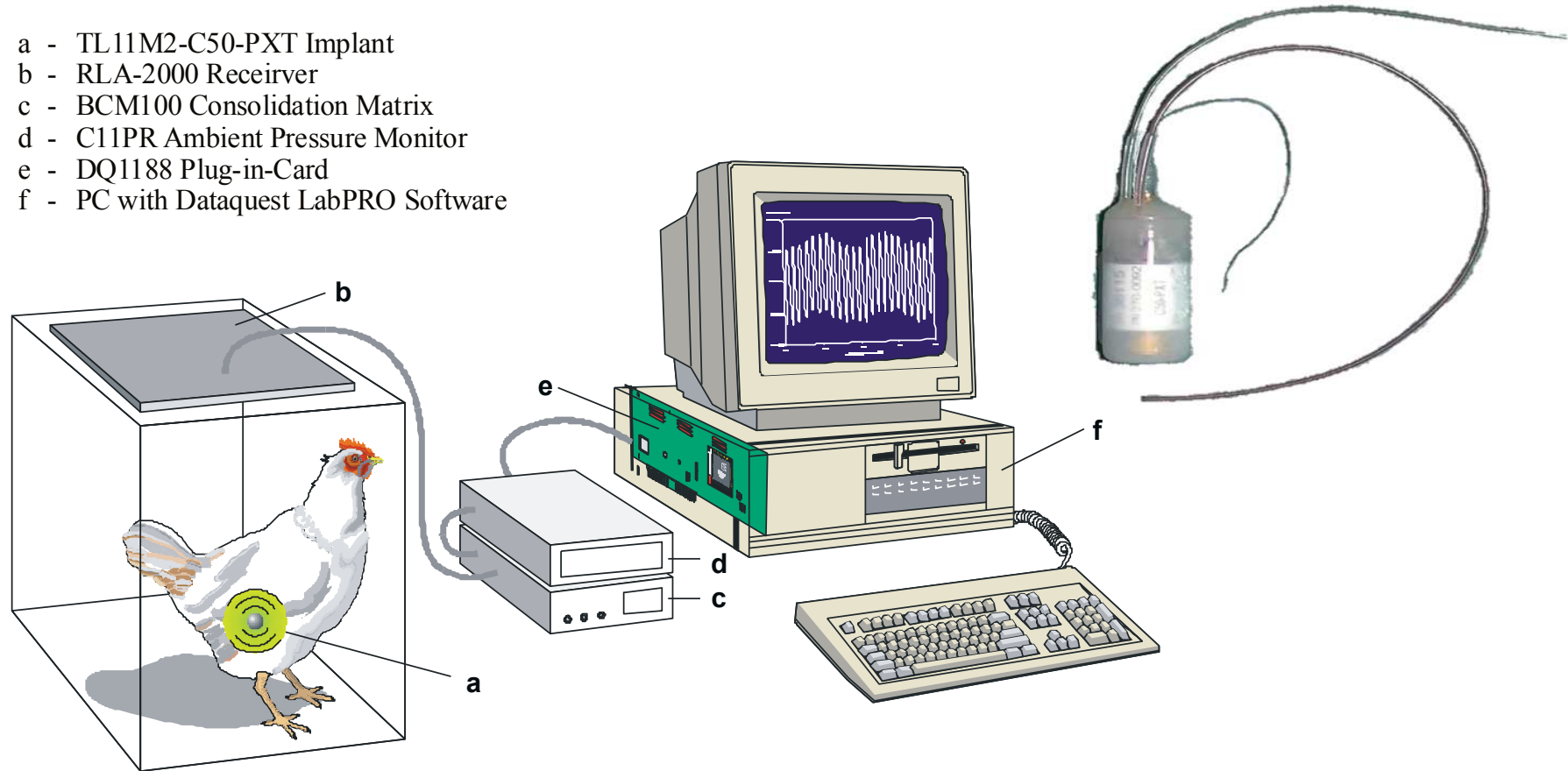
MRI



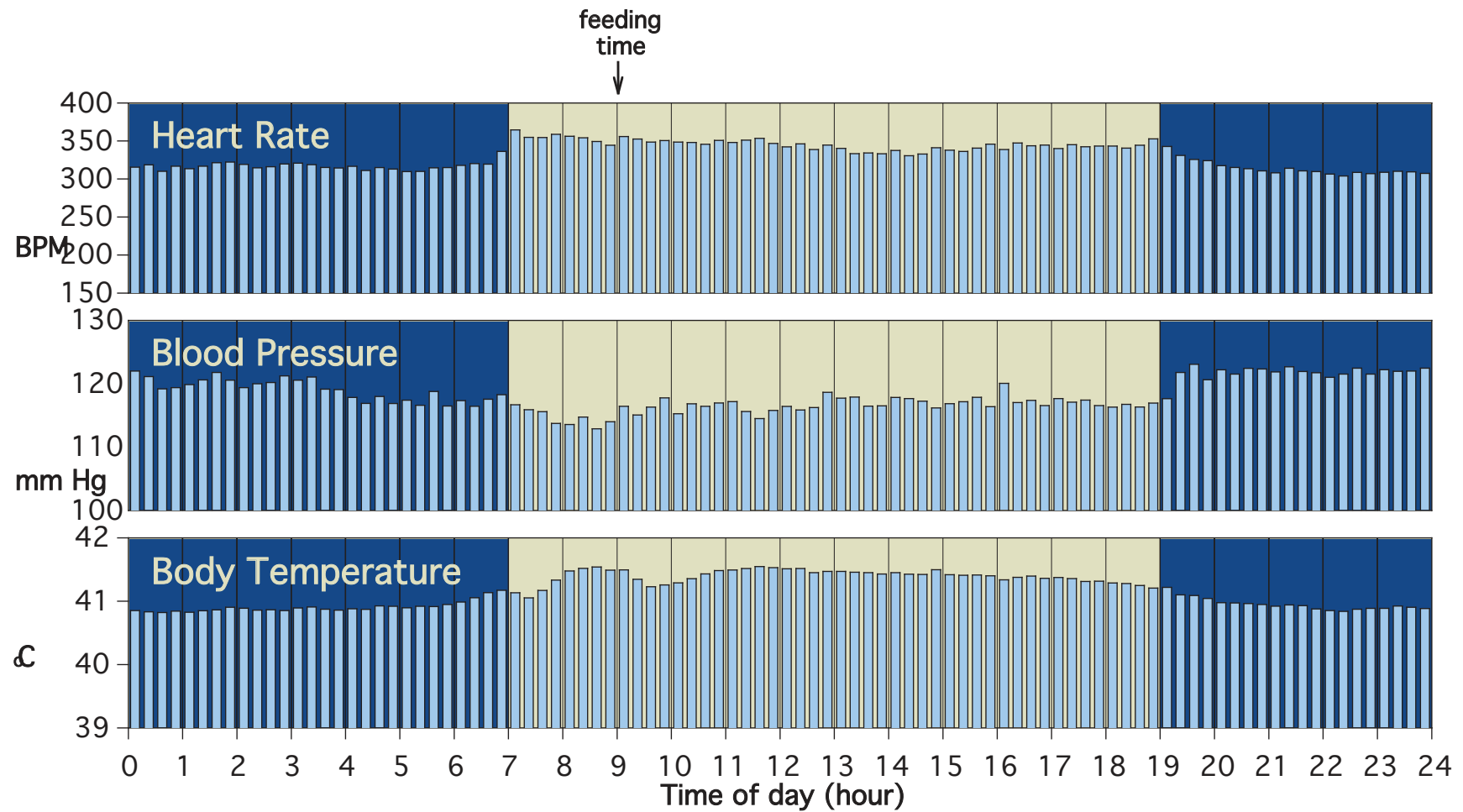


Components of DSI radiotelemetry and data acquisition system

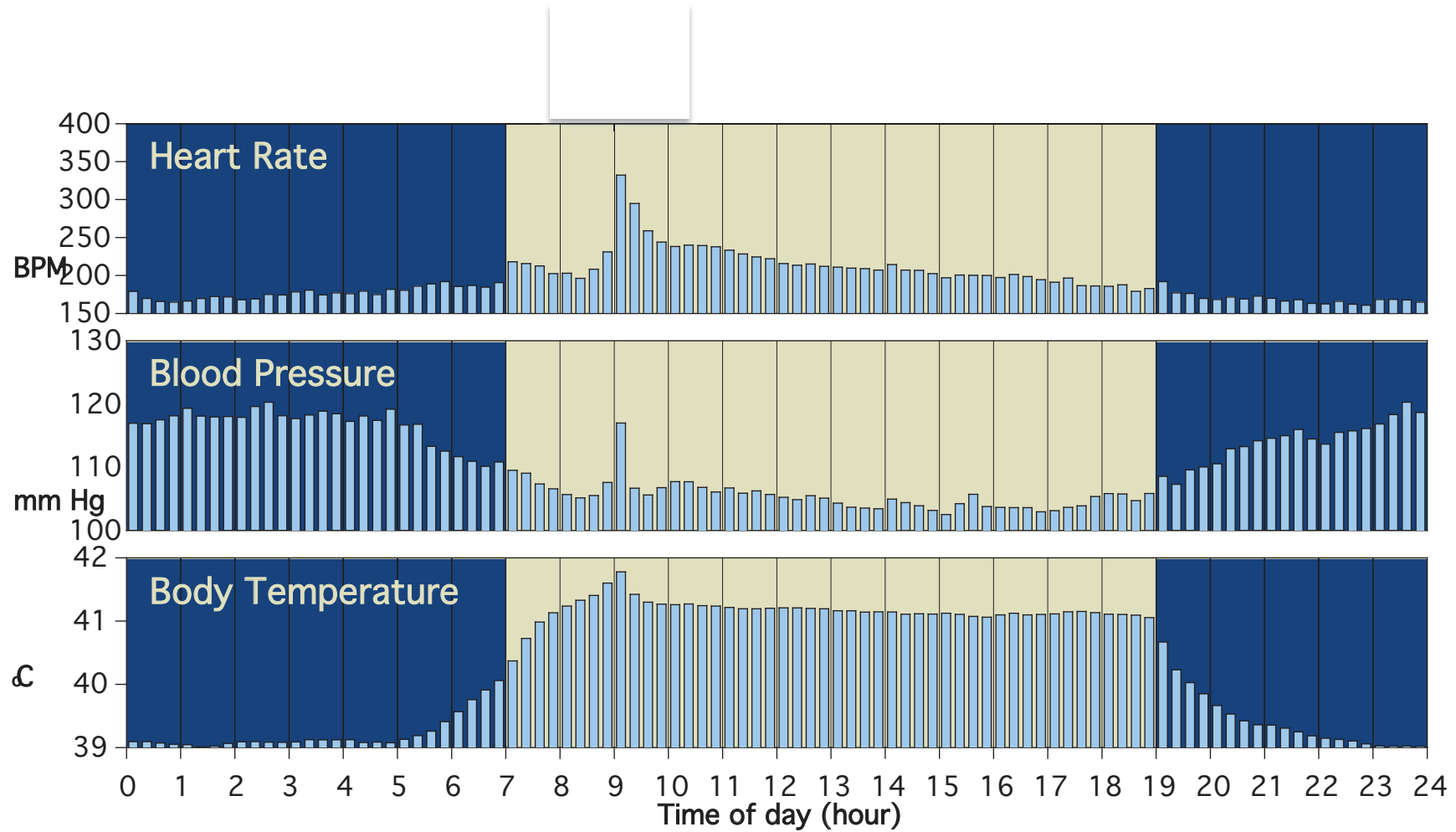
- a - TL11M2-C50-PXT Implant
- b - RLA-2000 Receiver
- c - BCM100 Consolidation Matrix
- d - C11PR Ambient Pressure Monitor
- e - DQ1188 Plug-in-Card
- f - PC with Dataquest LabPRO Software



24 h záznam sliedky krmenej *ad libitum*



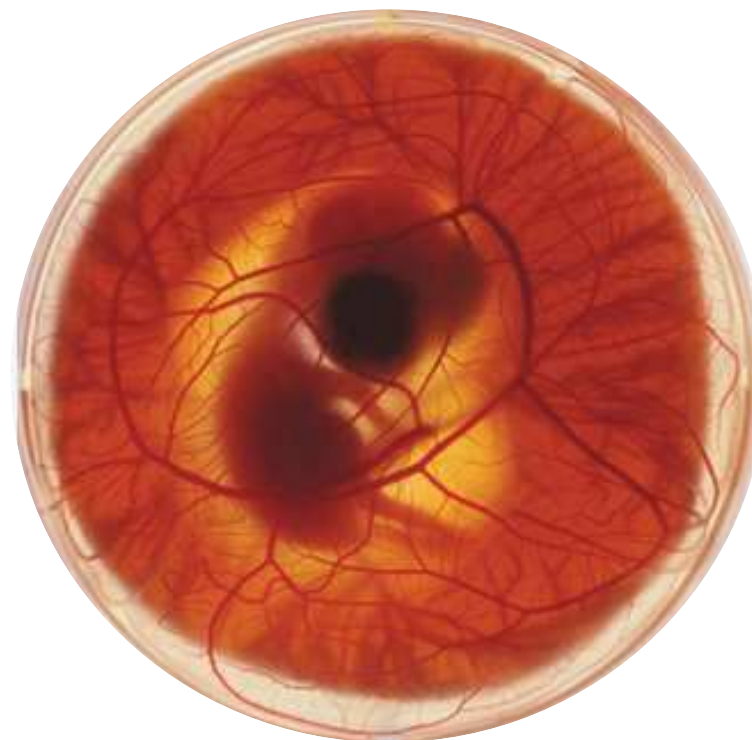
24 h záznam potravne reštrigovanej sličky



Embryo prepelice japonskej



Prepelica japonská (*Coturnix Japonica*)



Embryo prepelice japonskej (ED8)

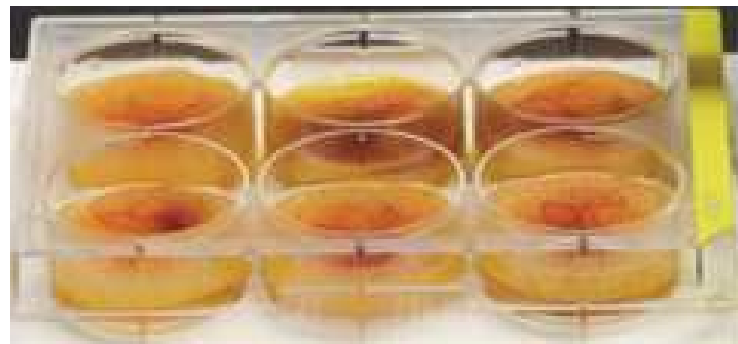
Chorioalantoická membrána prepelice japonskej



Stiahnutá a fixovaná CAM v 8 dni vývoja (ED8)

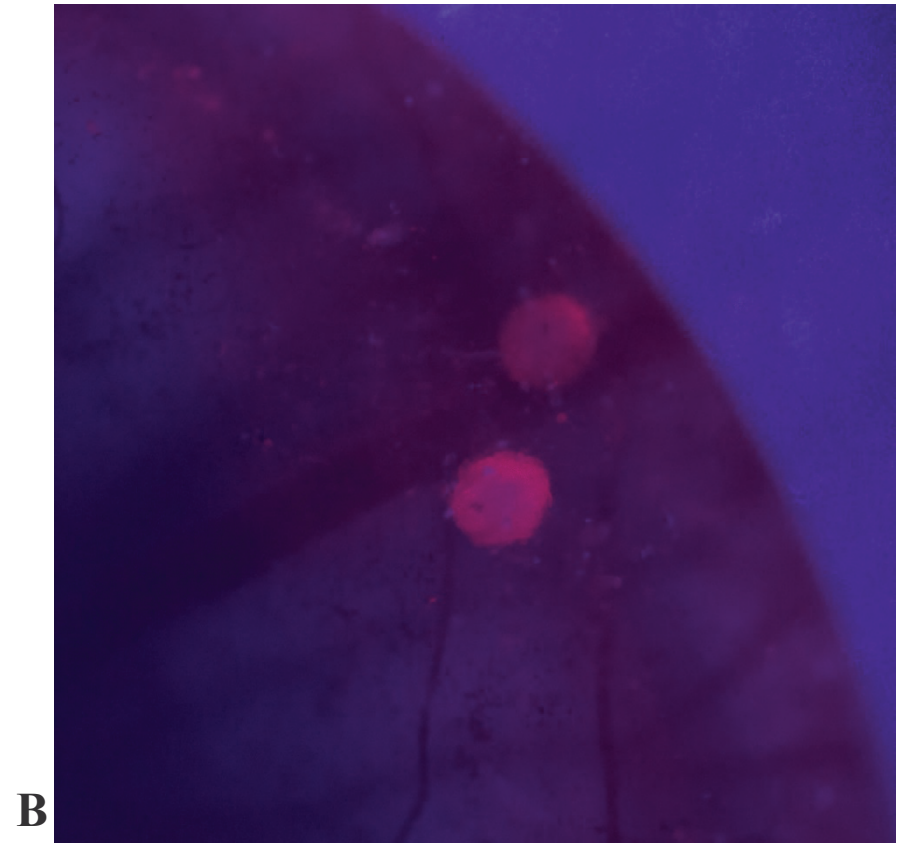
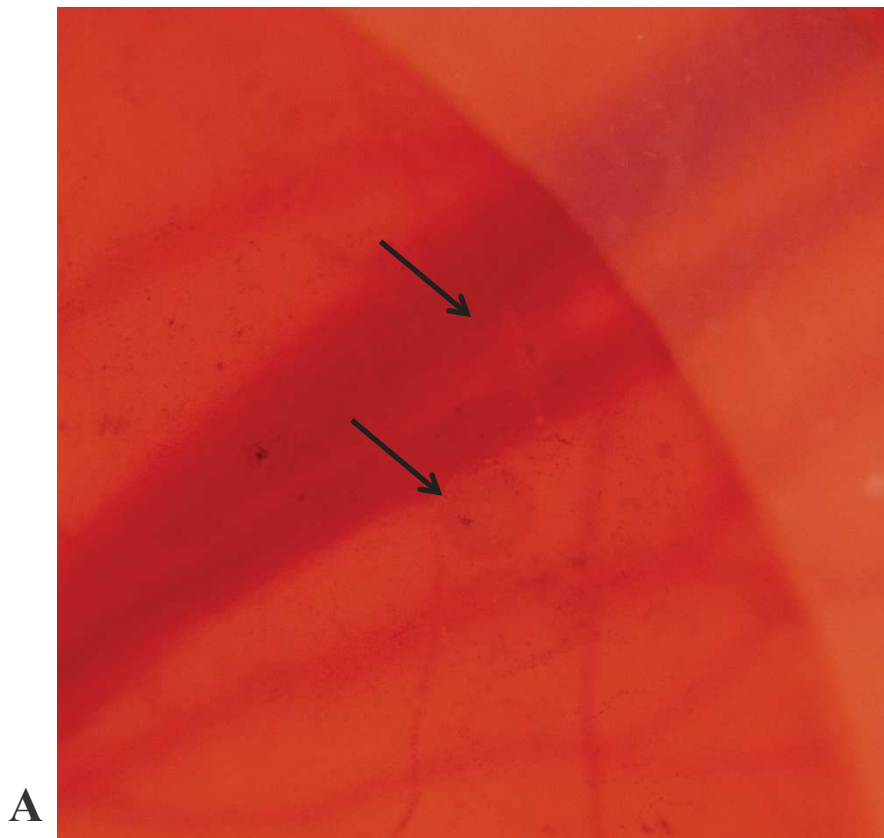


Vizualizácia vaskulatúry CAM vpichnutím intralipidu pod membránu na ED8



6-jamkové inkubačné pláty

Implantácia TE1 buniek na CAM



A- implantované sféroidy TE1 buniek na povrch CAM **B-** vizualizácia roztokom Hyp.