



**GHENT  
UNIVERSITY**

# Non-invasive wildlife endocrinology Supported by UHPLC-HRMS based steroidomics

FWO-SB PhDs Tom Cools

Promoted by:

Prof. Dr. Lynn Vanhaecke (Ghent University)

Dr. Jella Wauters (Ghent University x Leibniz Institute for Zoo and Wildlife Research)

Giant panda drawings by Mareen Albrecht a.k.a. lab technician @ IZW

Narration by Jella Wauters a.k.a. wildlife endocrinologist @IZW and Ghent university



Leibniz Institute for Zoo  
and Wildlife Research  
IN THE FORSCHUNGSVERBUND BERLIN E.V.





# Some characteristics

- Carnivore . . . eating bamboo
- Solitary animal
- Only once/year heat!





# In the wild . . .



# In the wild . . .



# In captivity???

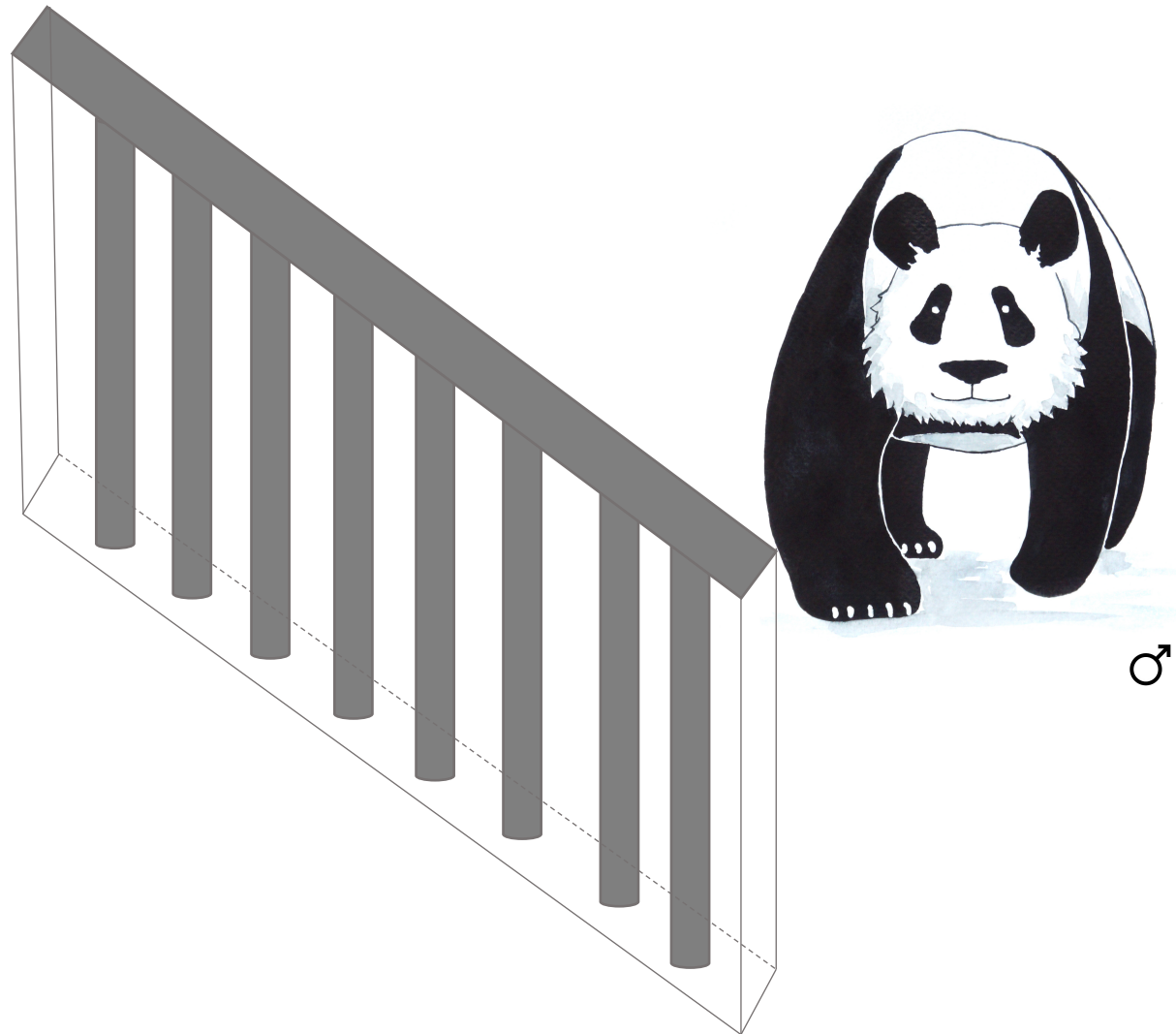


# In captivity???

→ Endocrinology urine samples



♀

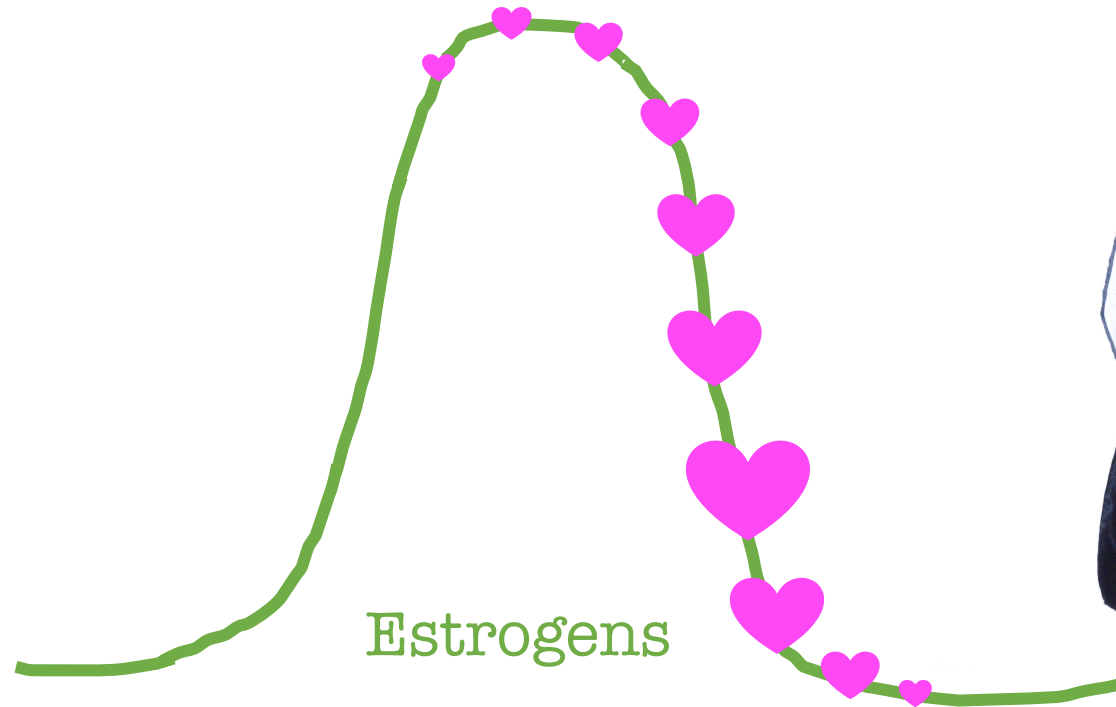


♂

# Captive breeding program

Only few hours – 72 hours/ YEAR !!!

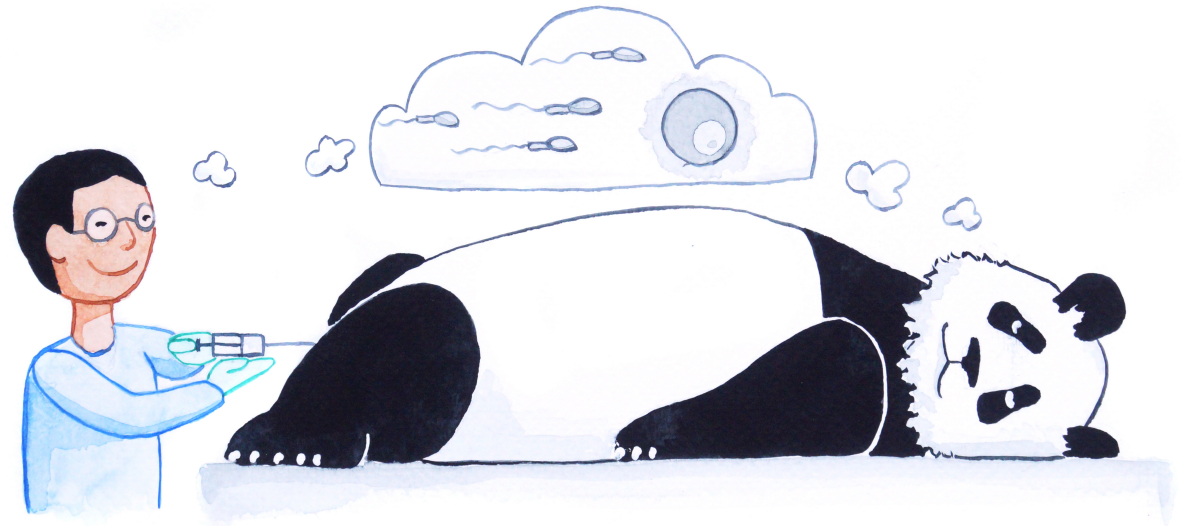
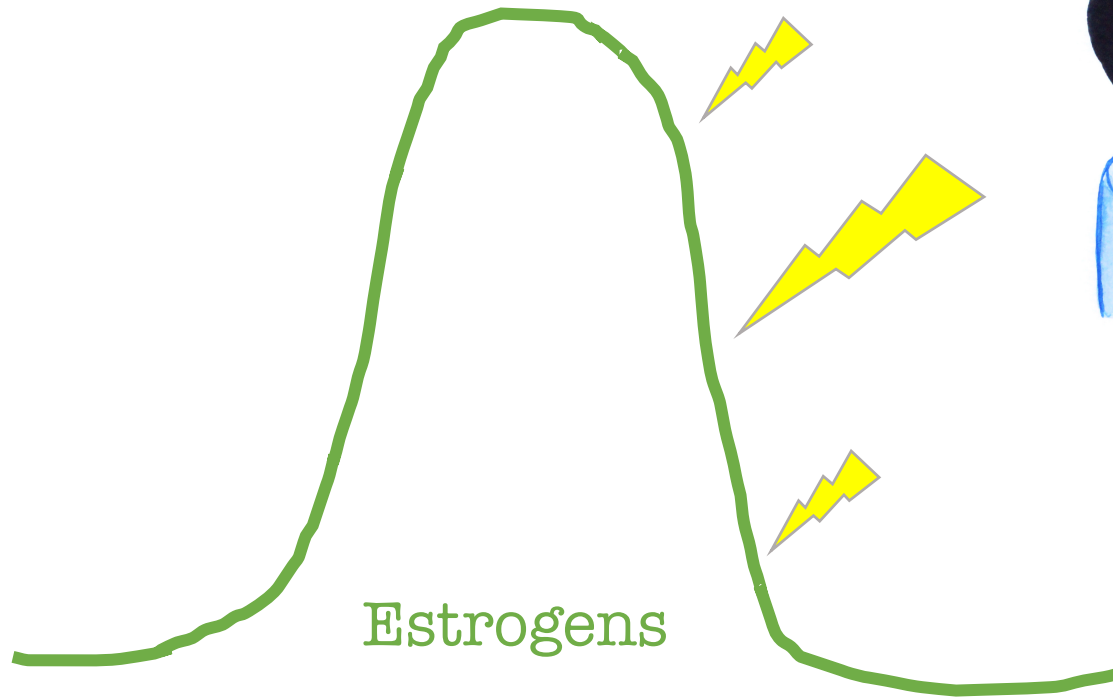
❖ Time frame for natural mating



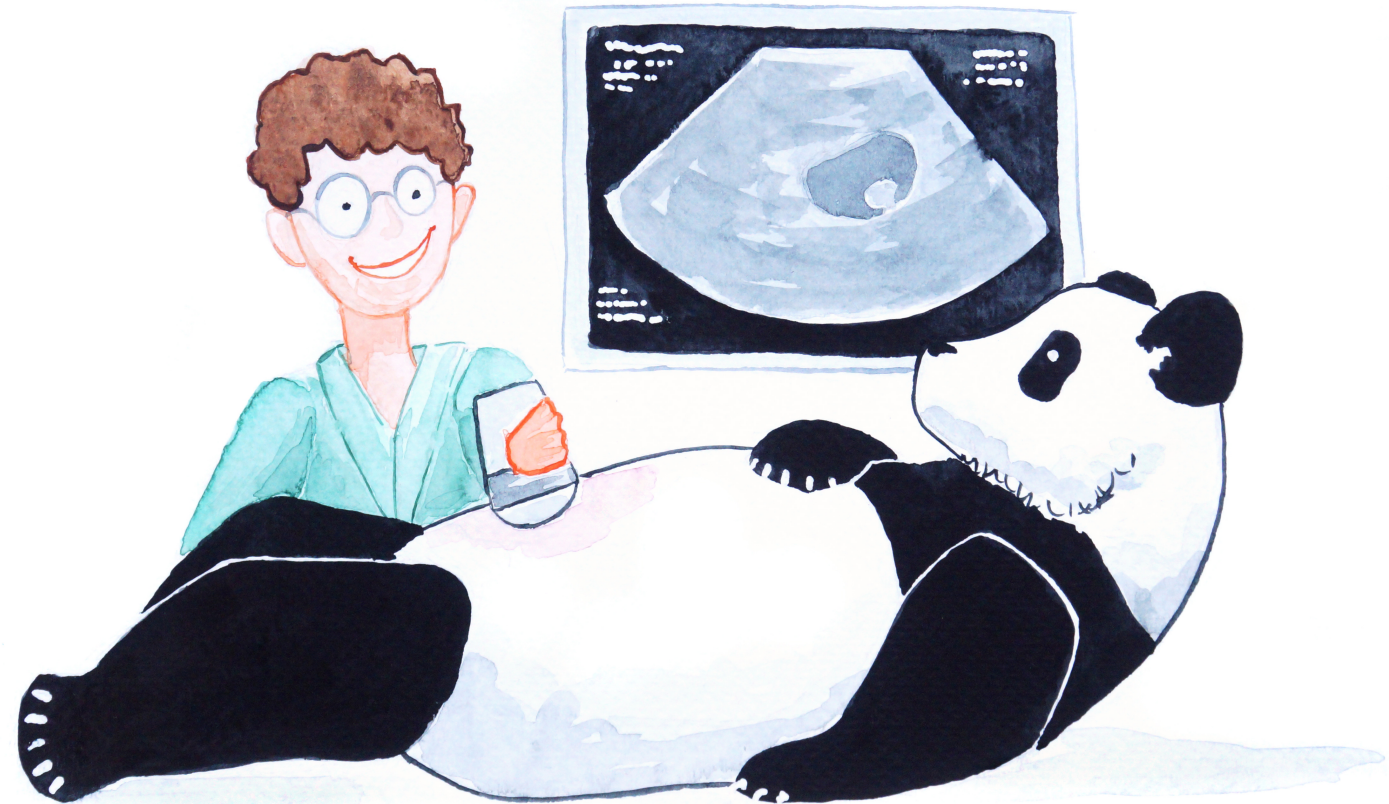


# Captive breeding program

❖ Time frame for artificial insemination



# Is she pregnant???



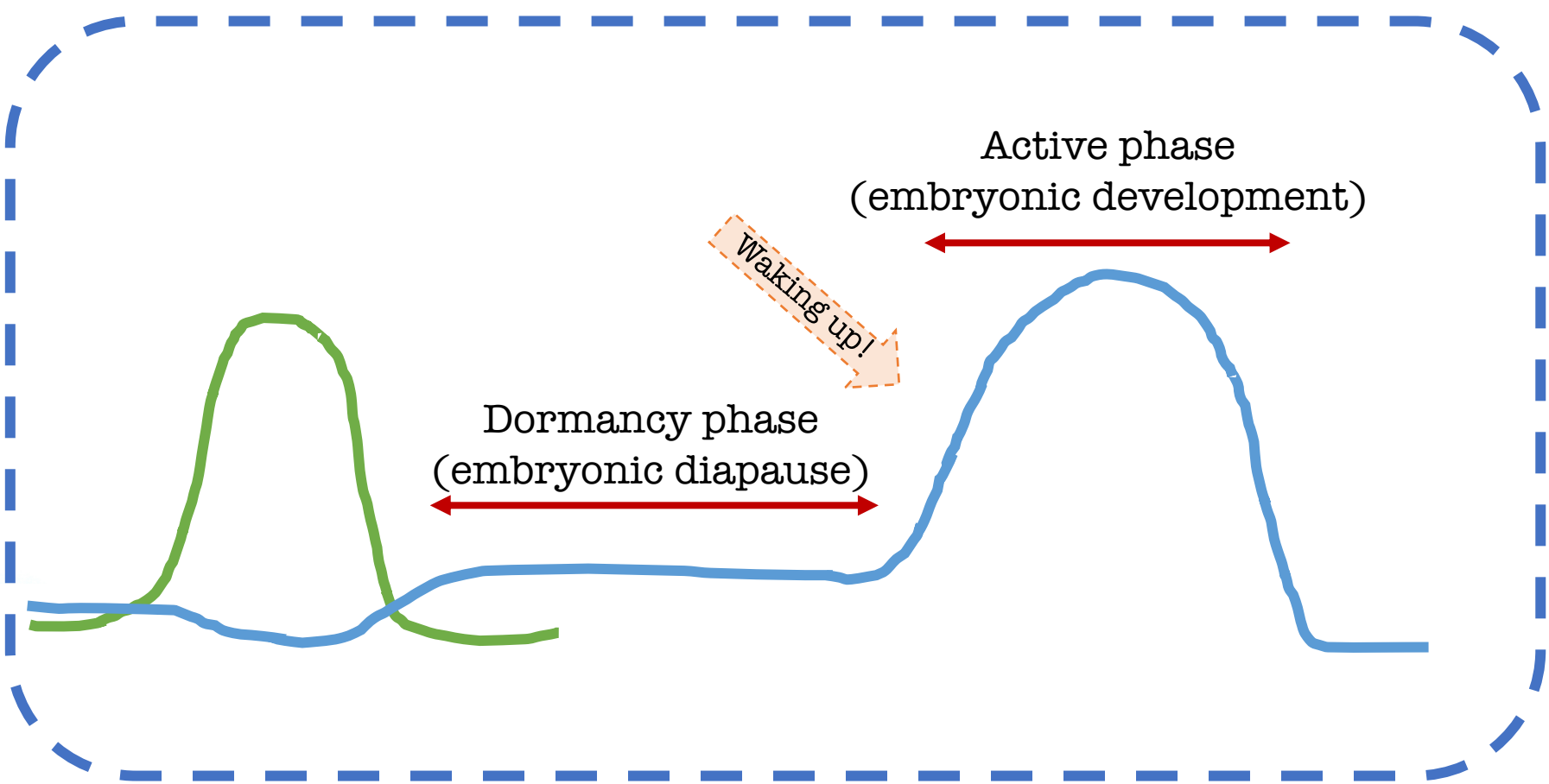


# Captive breeding program

❖ Pregnancy diagnosis



Pregnancy = phantom pregnancy!

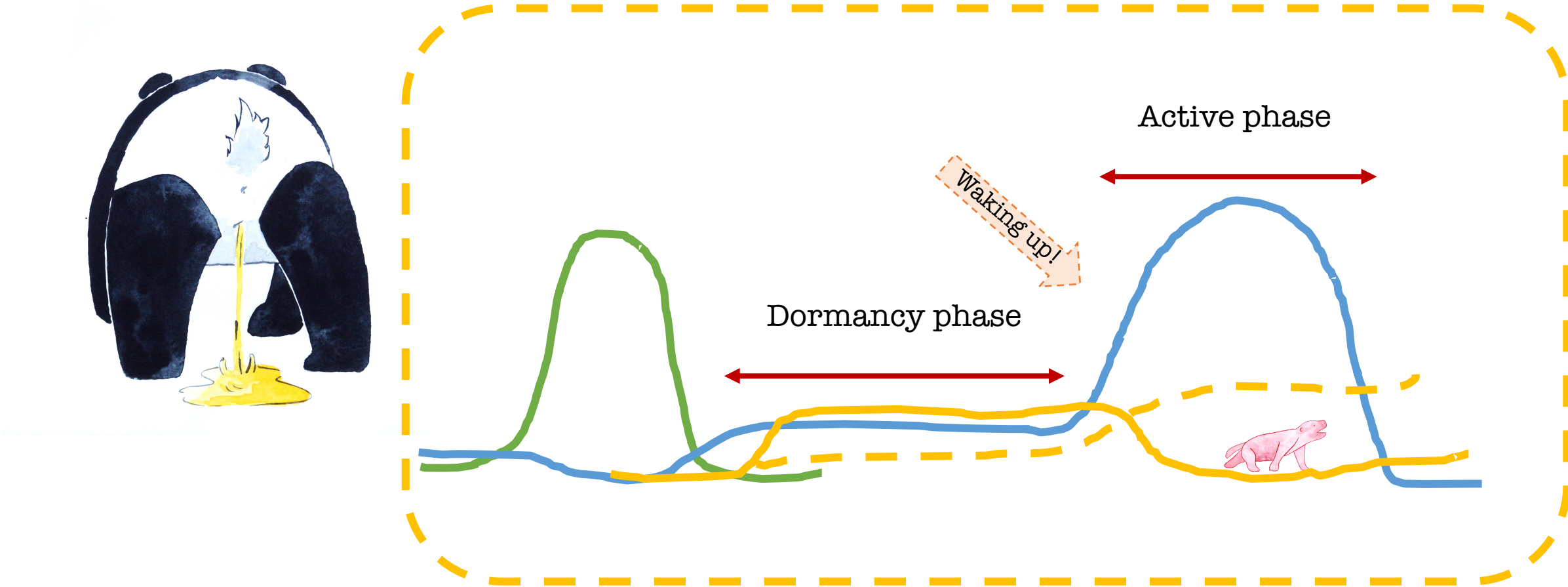


Estrogens

Progesteragens

# Captive breeding program

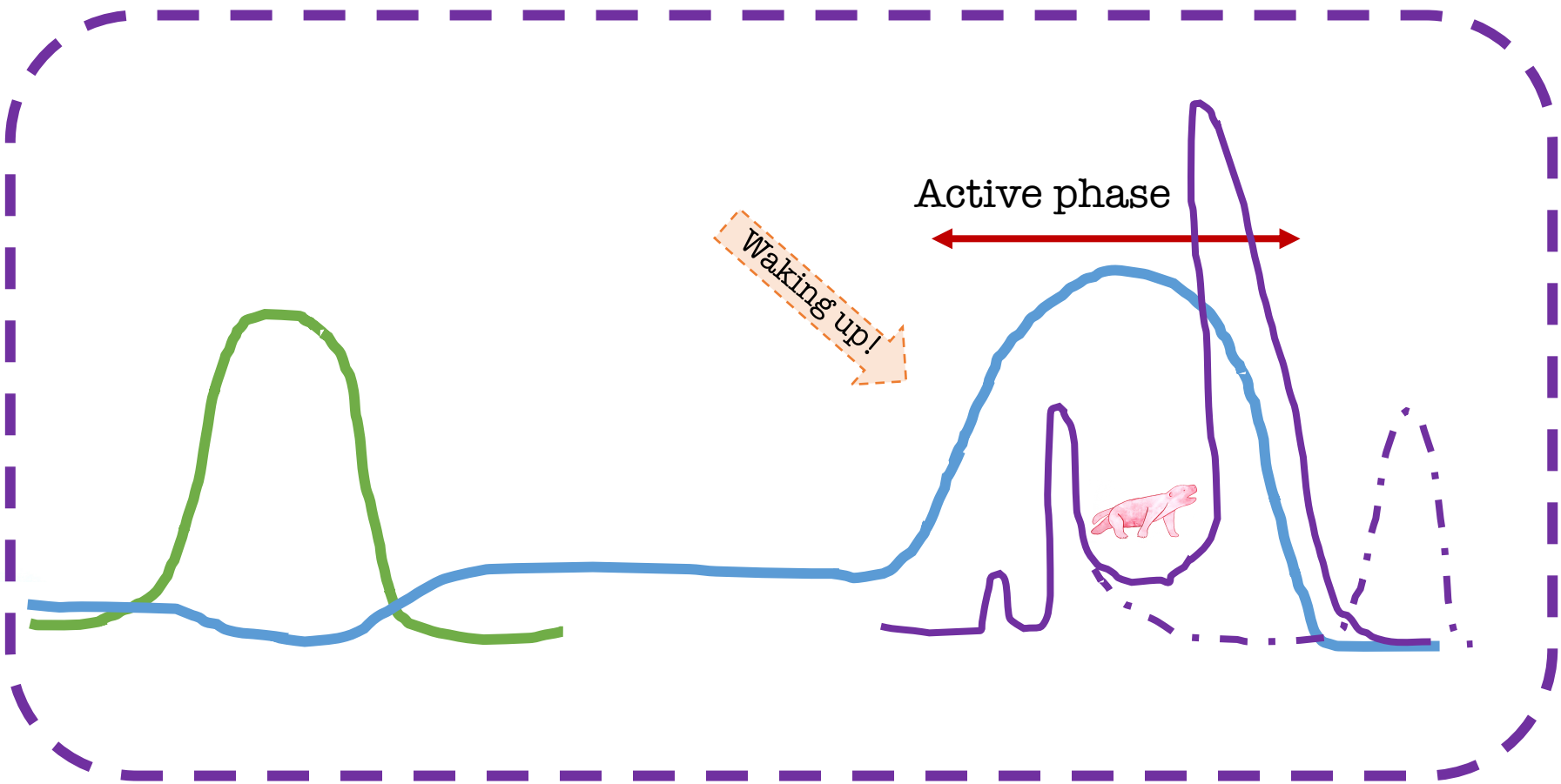
❖ Pregnancy diagnosis



# Captive breeding program

❖ Pregnancy diagnosis

Pregnancy  $\neq$  Phantom pregnancy

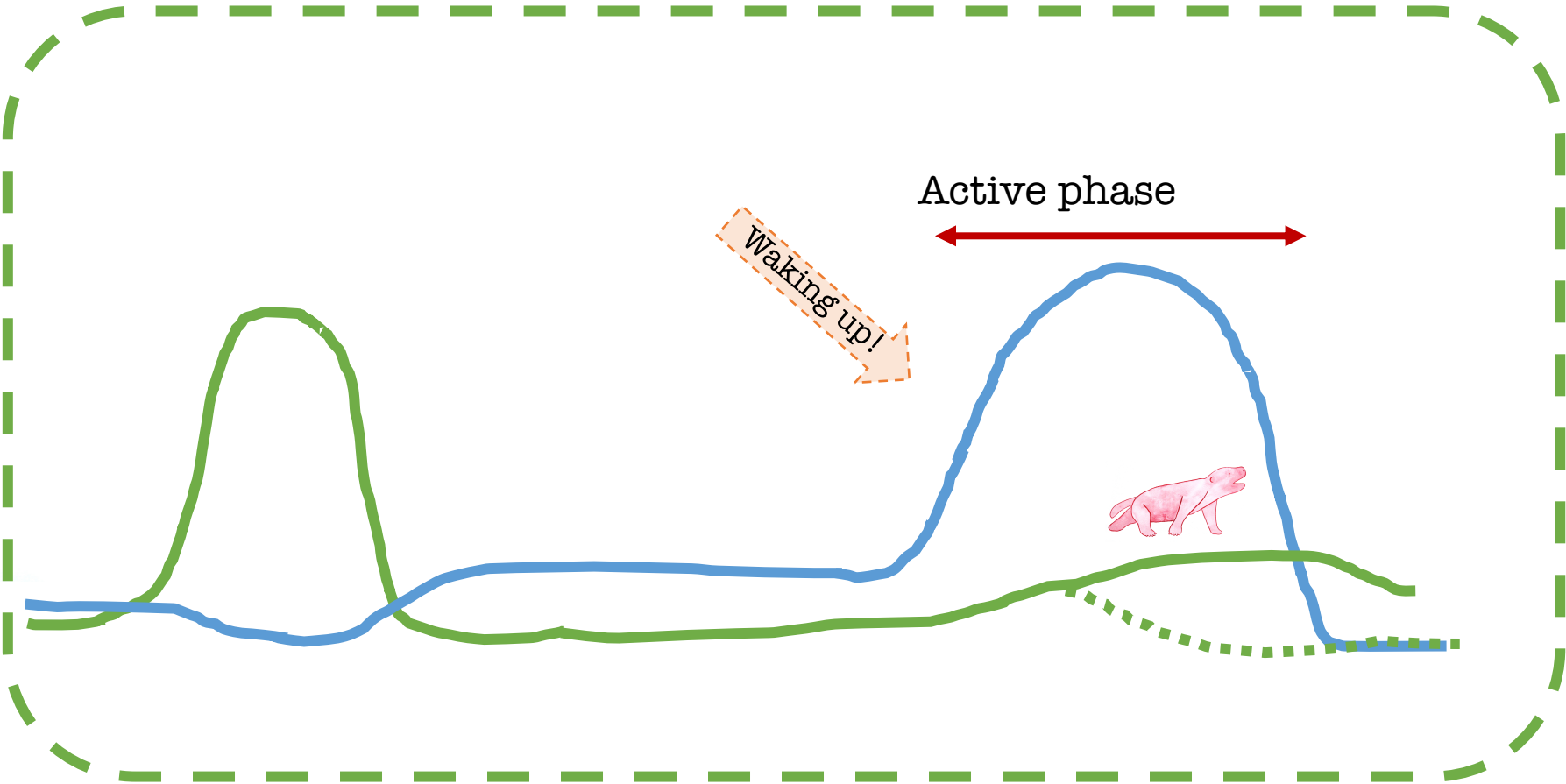


# Captive breeding program

❖ Pregnancy diagnosis



Pregnancy  $\neq$  Phantom pregnancy

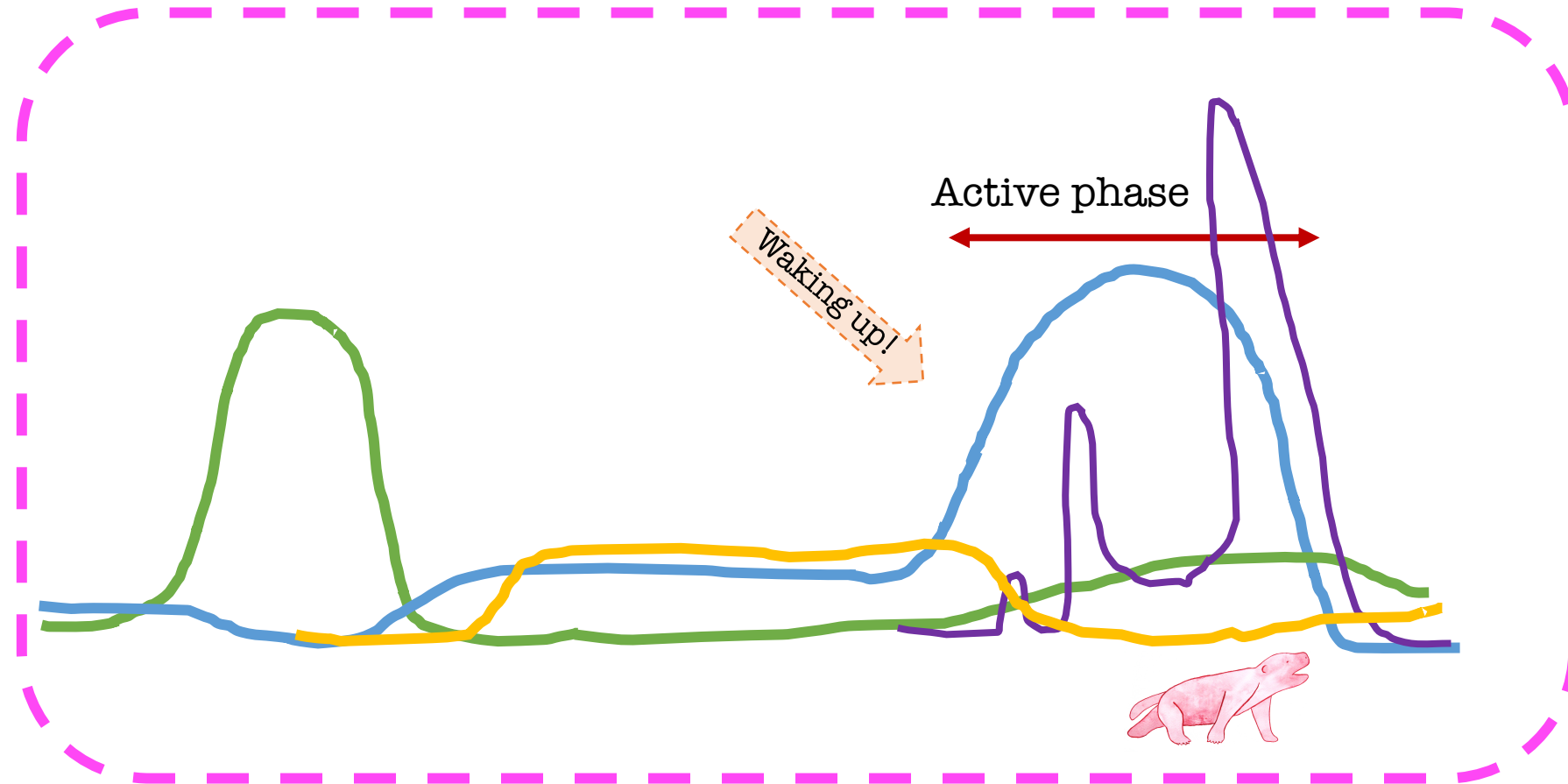


Estrogens (Wilson et al., 2019; IZW-pub)

Progestagens

# Captive breeding program

## ❖ Pregnancy diagnosis



Estrogens (*Wilson et al., 2019; IZW-pub*)

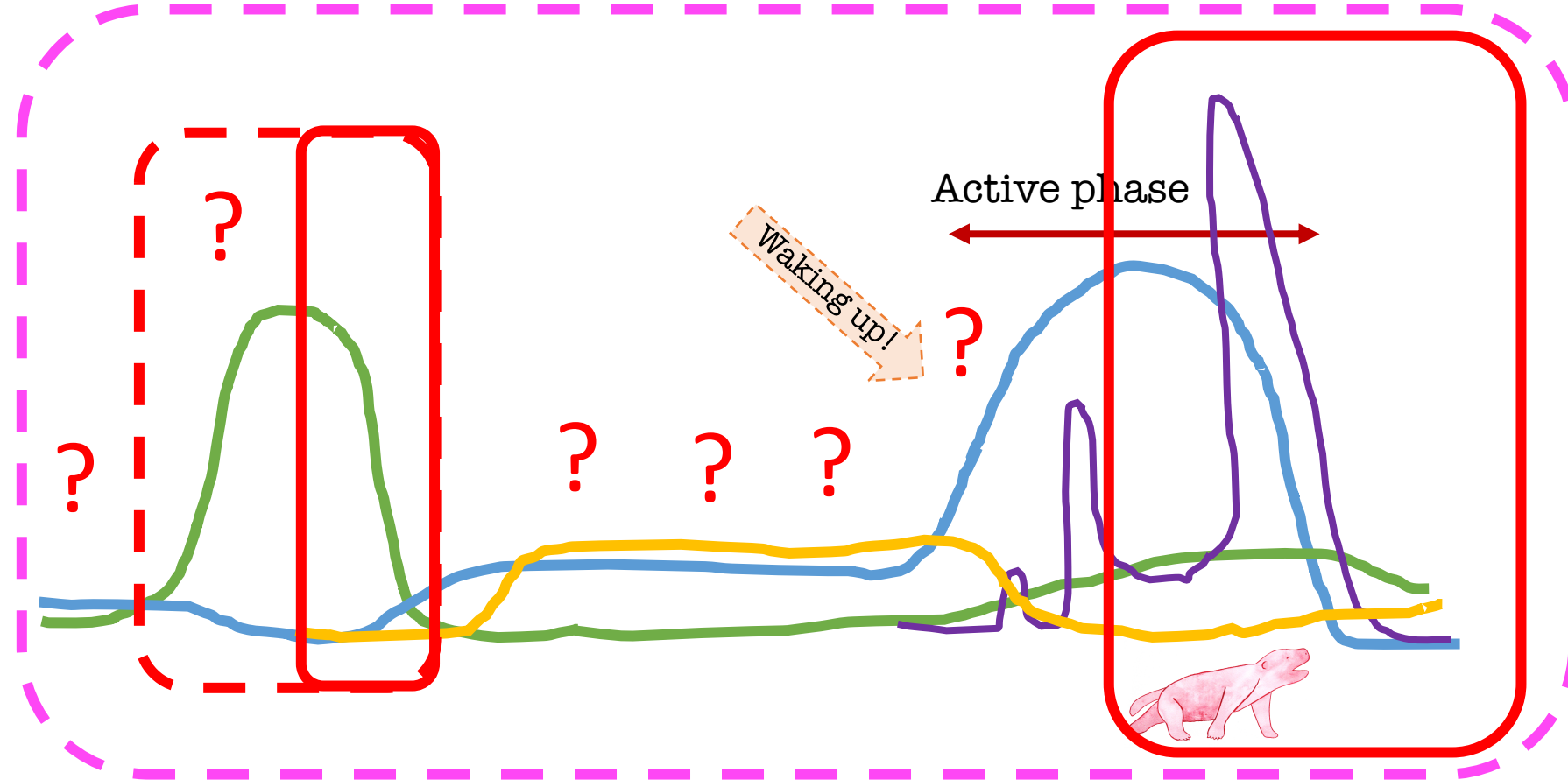
Ceruloplasmin (*Willis et al., 2011*)

Progesterone

PGFM (*Roberts et al., 2018; Ab = IZW*)



# Giant panda reproductive monitoring



Estrogens

Progesterone

Ceruloplasmin

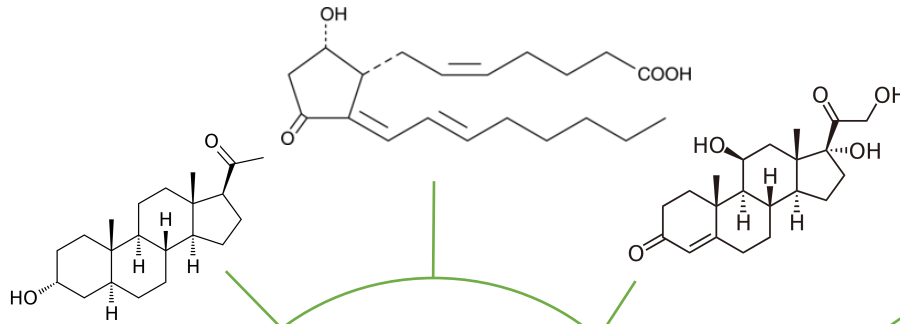
PGFM

# Advanced wildlife endocrinology: non-invasive monitoring 2.0 to save species biodiversity

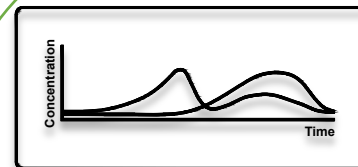
Plasticity & reproduction  
of endangered species



Existing techniques



Steroidomics using high  
resolution mass  
spectrometry

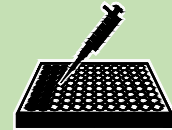
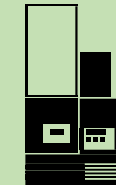


Understanding species  
biology

1<sup>st</sup> MS platform for



Artificial reproduction &  
wildlife management



Development & validation  
alternative fast  
monitoring methods



Wildlife conservation  
research



Non-invasively  
sampled matrices

# LIMET – wildlife endocrinology

- ❖ Prof. Dr. Lynn Vanhaecke – head Laboratory of Integrative Metabolomics (LIMET)
  - ❖ Dr. Jella Wauters – postdoctoral scientist
  - ❖ PhDs Tom Cools – PhD student
  - ❖ Dirk Stockx – technician
- ❖ Contact: [Jella.Wauters@ugent.be](mailto:Jella.Wauters@ugent.be)

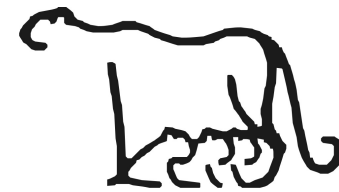


# External collaborators

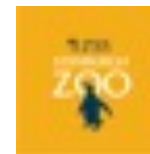
The wildlife metabolomics platform will be developed in collaboration with the Leibniz Institute of Zoo and Wildlife Research, Berlin Germany



Leibniz Institute for Zoo  
and Wildlife Research  
IN THE FORSCHUNGSVERBUND BERLIN E.V.



The giant panda research is supported by:





Dr. Jella Wauters - PhD, DVM

Postdoc Wildlife Endocrinology/Metabolomics



WeChat ID: JellaWauters

## DEPARTMENT OF TRANSLATIONAL PHYSIOLOGY, INFECTIOLOGY AND PUBLIC HEALTH

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