

How nutrition can influence breeding performances in cat ?

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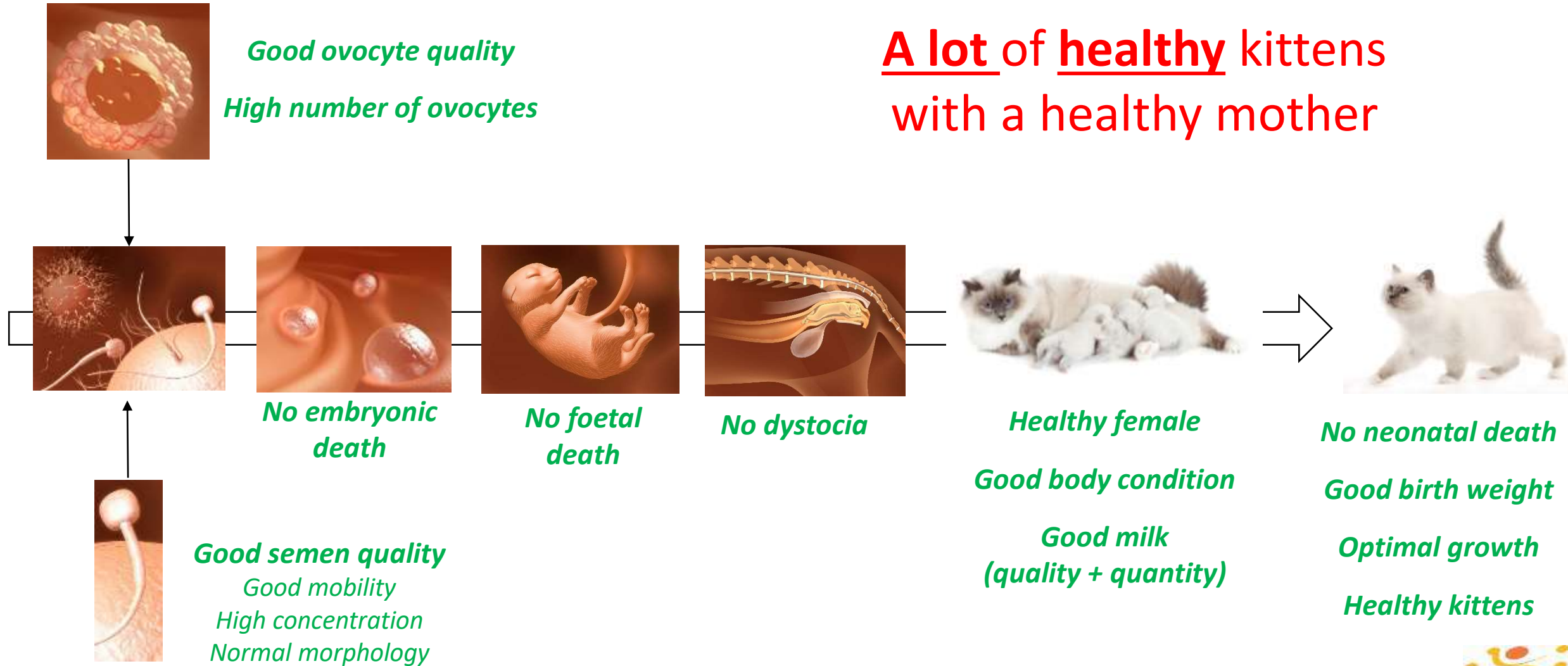
NeoCare
Néonatalogie des Carnivores
Reproduction et Elevage



What does it mean « good breeding performances » ?



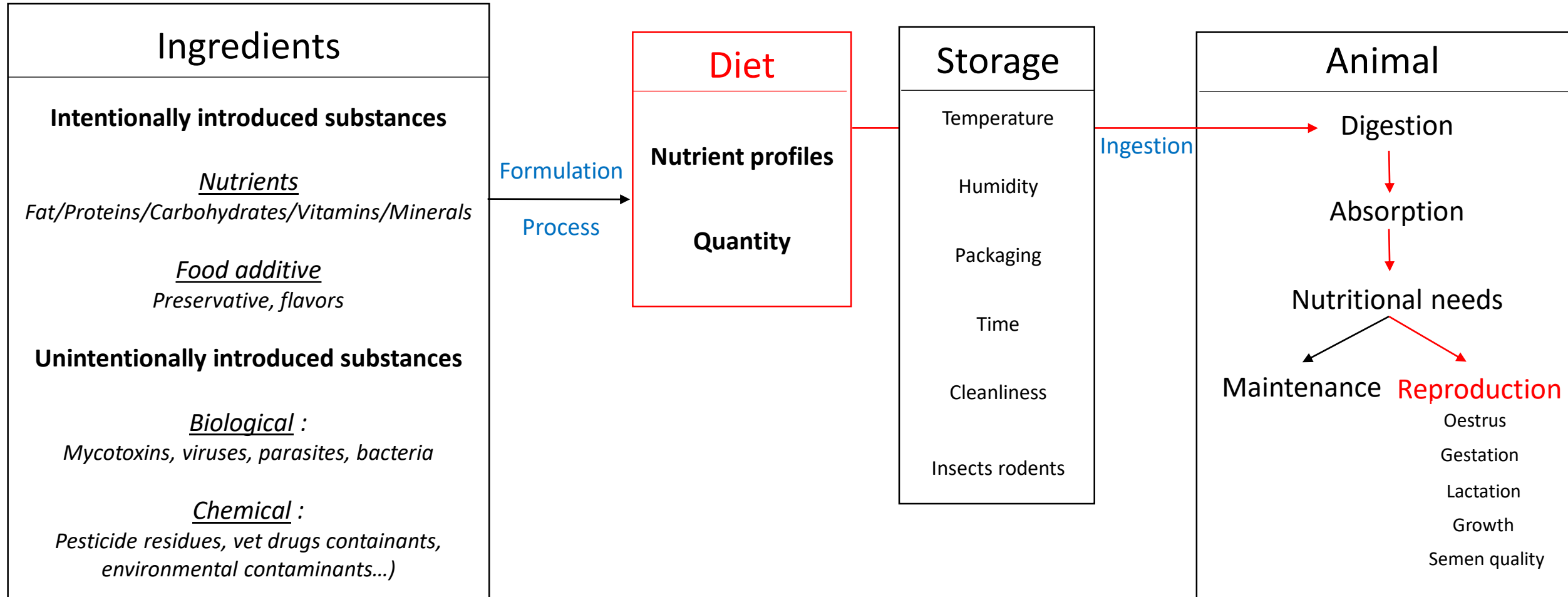
Good breeding performances if.....



How food can influence breeding performances ?



How food can influence breeding performances ?



Link between food and breeding performances



Breeding performances



Raw meat diets → nutritional concerns and safety risk

Nutritional concerns

60 %

Major nutritional imbalances

95 homemade raw meat diets analyzed

Safety risks

21 – 48 %

Contaminated by *Salmonella* sp

Campylobacter spp

Toxoplasma gondii

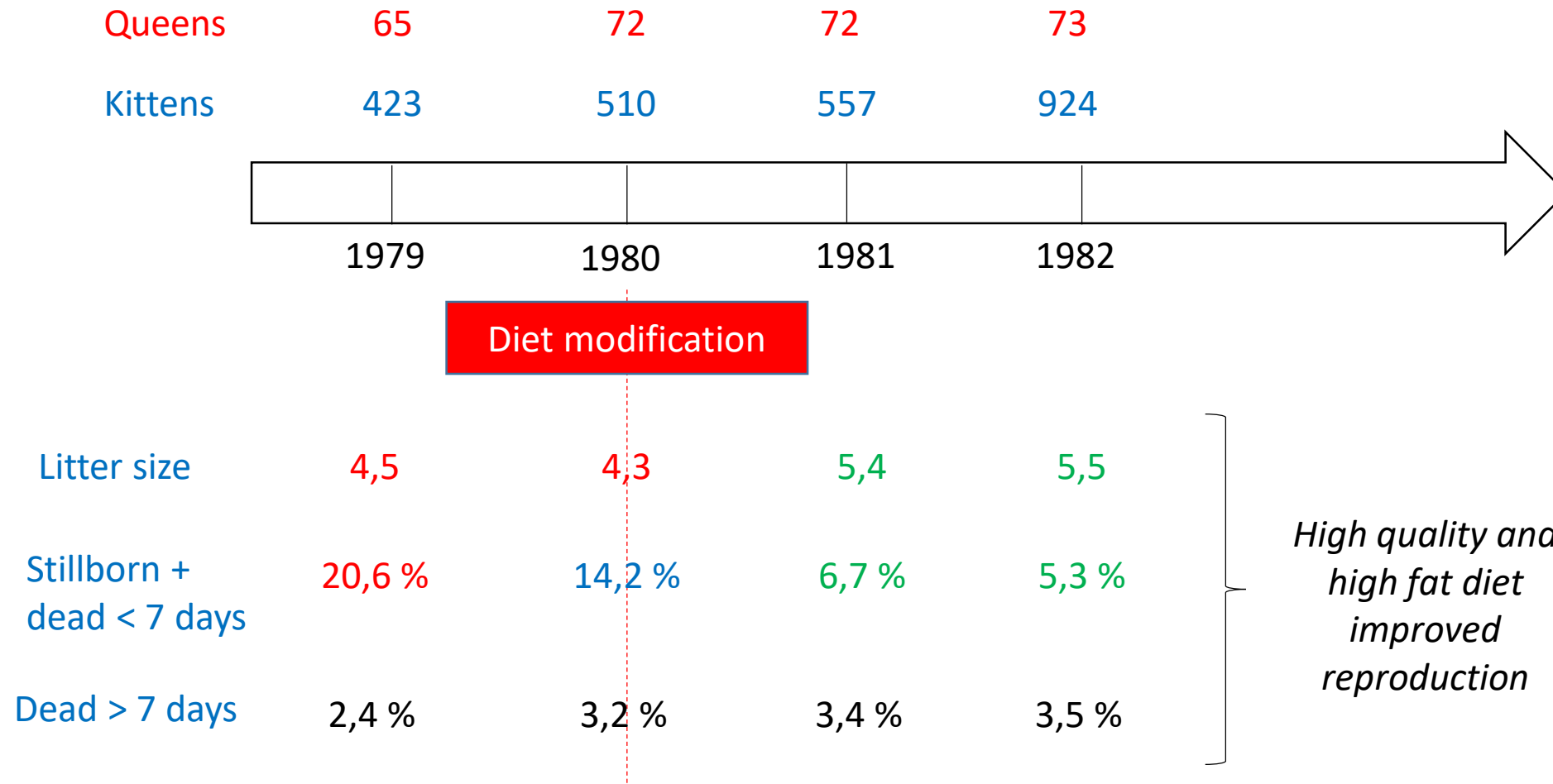
Link between food and breeding performances



Breeding performances



Modification of the diet can influence breeding performances



Olovson SG. Diet and breeding performance in cats. Laboratory animals (1986), 20 : 221 – 230.

Link between food and breeding performances



Breeding performances



Consequences of overfeeding before and during gestation



A scale to evaluate body condition score



BODY CONDITION SCORE CAT



TOO THIN

1



- Ribs, spine and pelvic bones easily visible on shorthaired cats
- Very narrow waist
- Small amount of muscle
- No palpable fat on the rib cage
- Severe abdominal tuck

2



- Ribs easily visible on shorthaired cats
- Very narrow waist
- Loss of muscle mass
- No palpable fat on the rib cage
- Very pronounced abdominal tuck

3



- Ribs visible on shorthaired cats
- Obvious waist
- Very small amount of abdominal fat
- Marked abdominal tuck

IDEAL

4



- Ribs not visible but are easily palpable
- Obvious waist
- Minimal amount of abdominal fat

5



- Well proportioned
- Ribs not visible but are easily palpable
- Obvious waist
- Small amount of abdominal fat
- Slight abdominal tuck

6



- Ribs not visible but palpable
- Waist not clearly defined when seen from above
- Very slight abdominal tuck

OVERWEIGHT

OVERWEIGHT

7



- Ribs difficult to palpate under the fat
- Waist barely visible
- No abdominal tuck
- Rounding of abdomen with moderate abdominal pad

8



- Ribs not palpable under the fat
- Waist not visible
- Slight abdominal distension

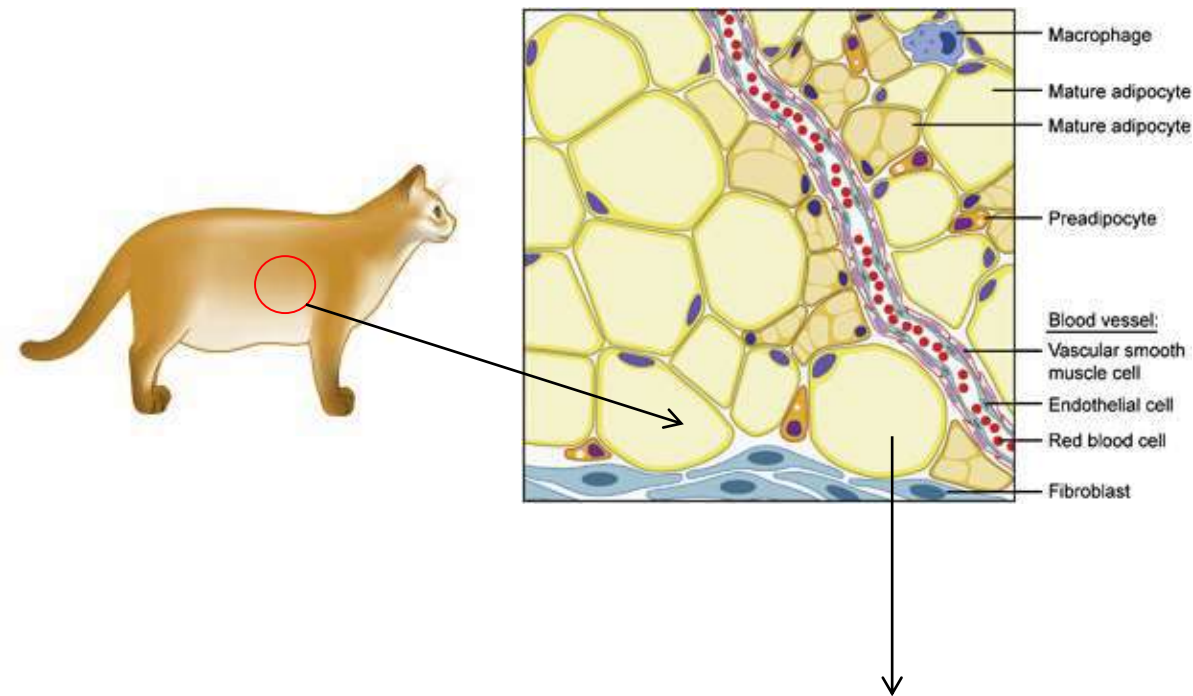
OBES

9



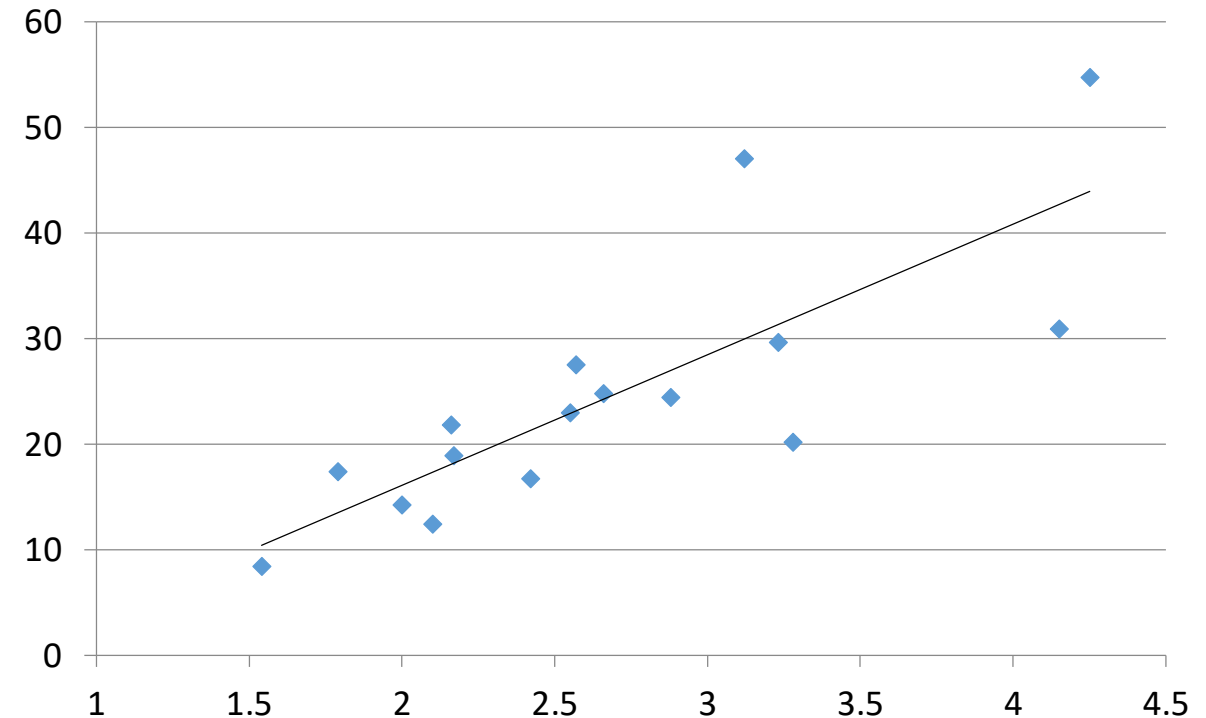
- Ribs not palpable under a thick layer of fat
- Waist absent
- Obvious abdominal distension
- Extensive abdominal fat deposits

Leptin : a peptide hormone secreted by adipocytes



Leptin

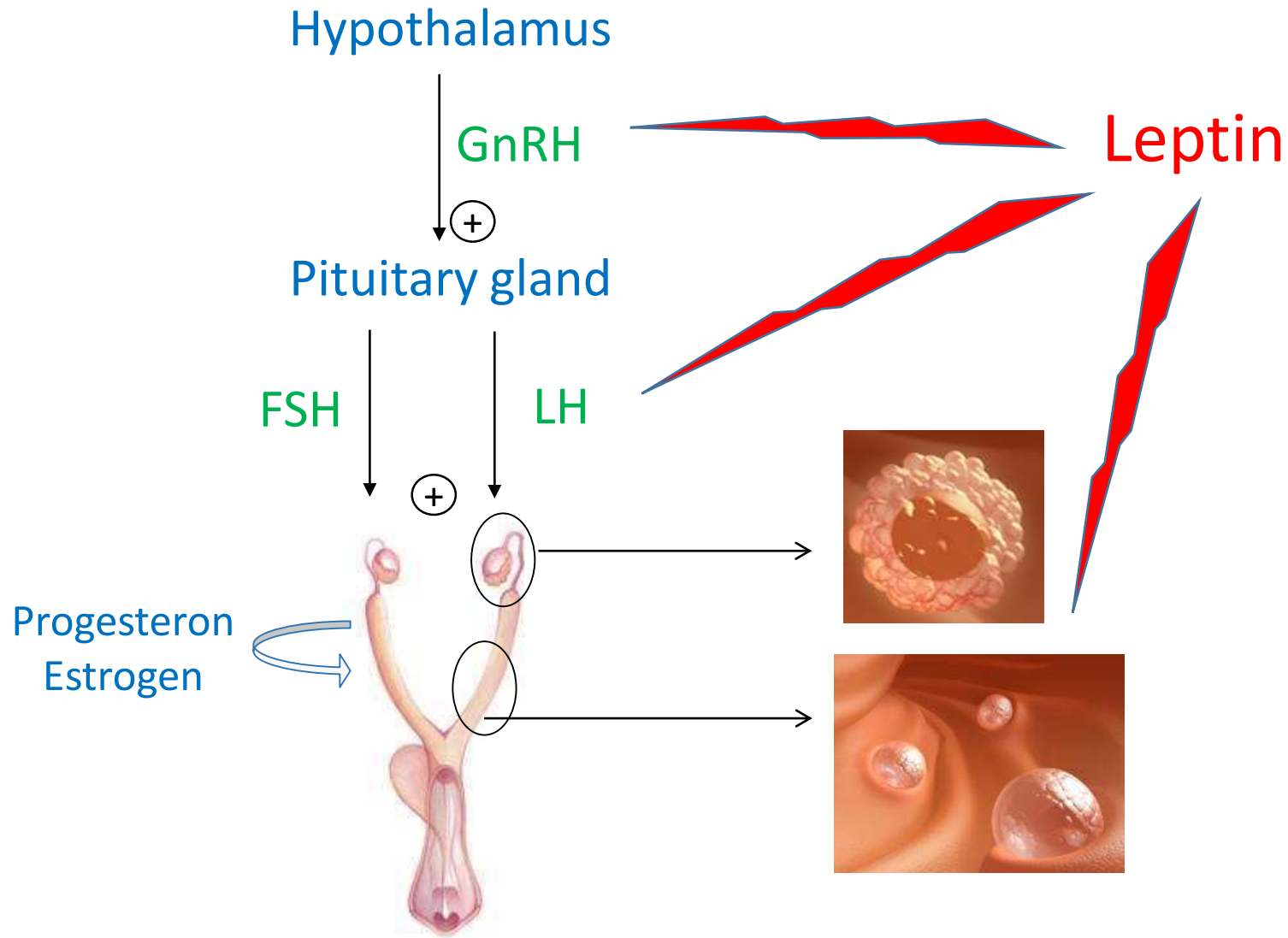
Plasma leptin concentration
(ng/ml)



Body fat mass
(kg)

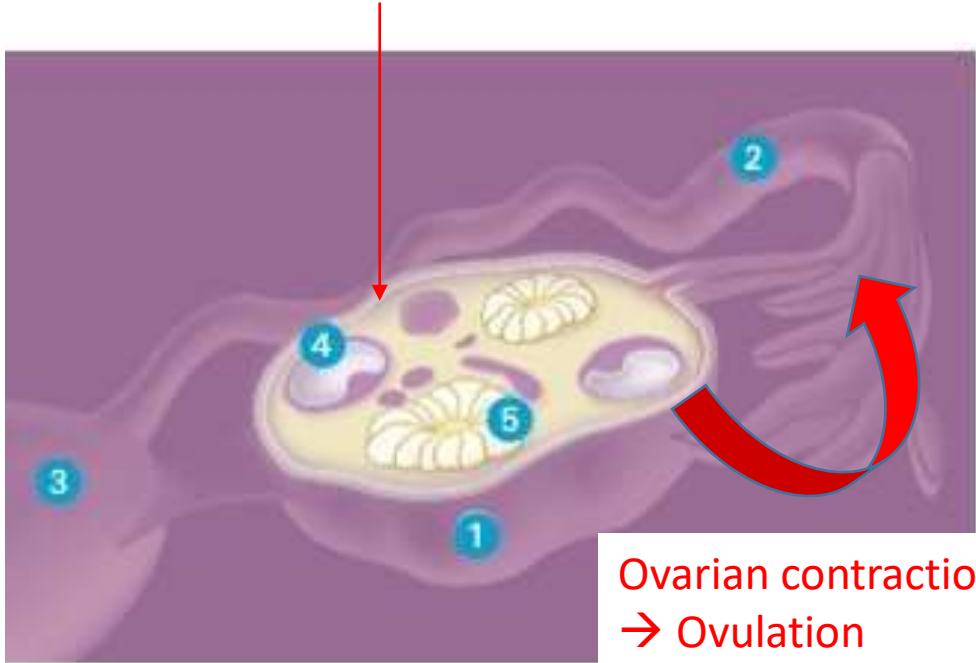
Appleton DJ et al. Plasma leptin concentrations in cats: reference range, effect of weight gain and relationship with adiposity as measured by dual energy X-ray absorptiometry. JFMS (2000) 2, 191–199

Obesity induces modifications in hormonal secretions

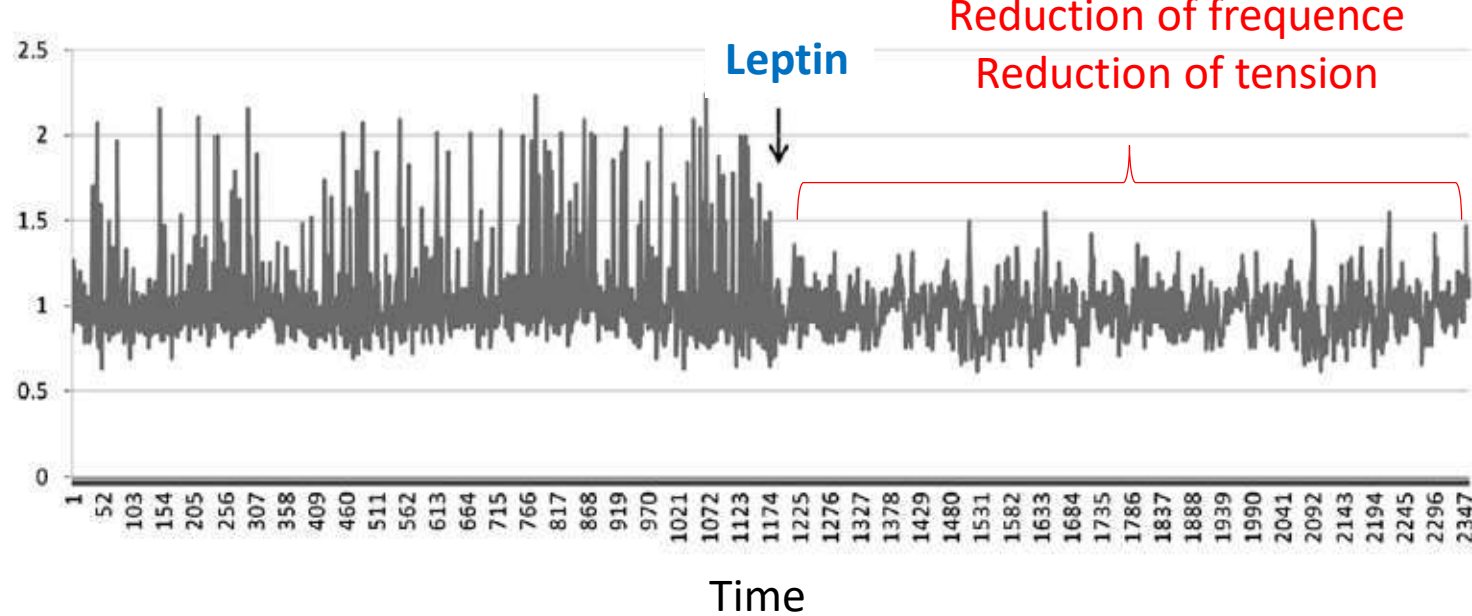


Leptin decrease ovary contractility

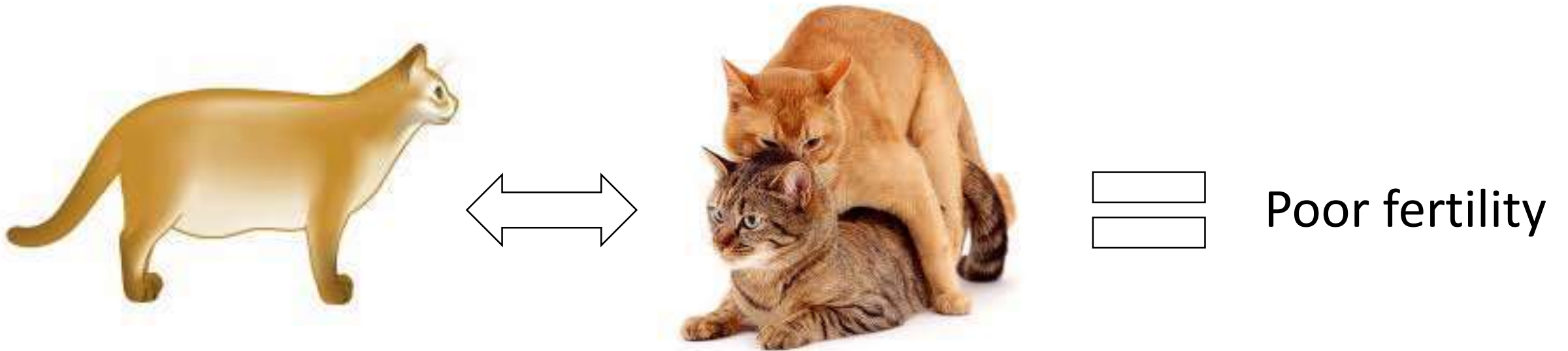
Leptin receptors

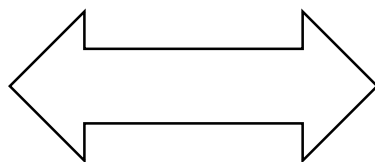


Ovary contractility

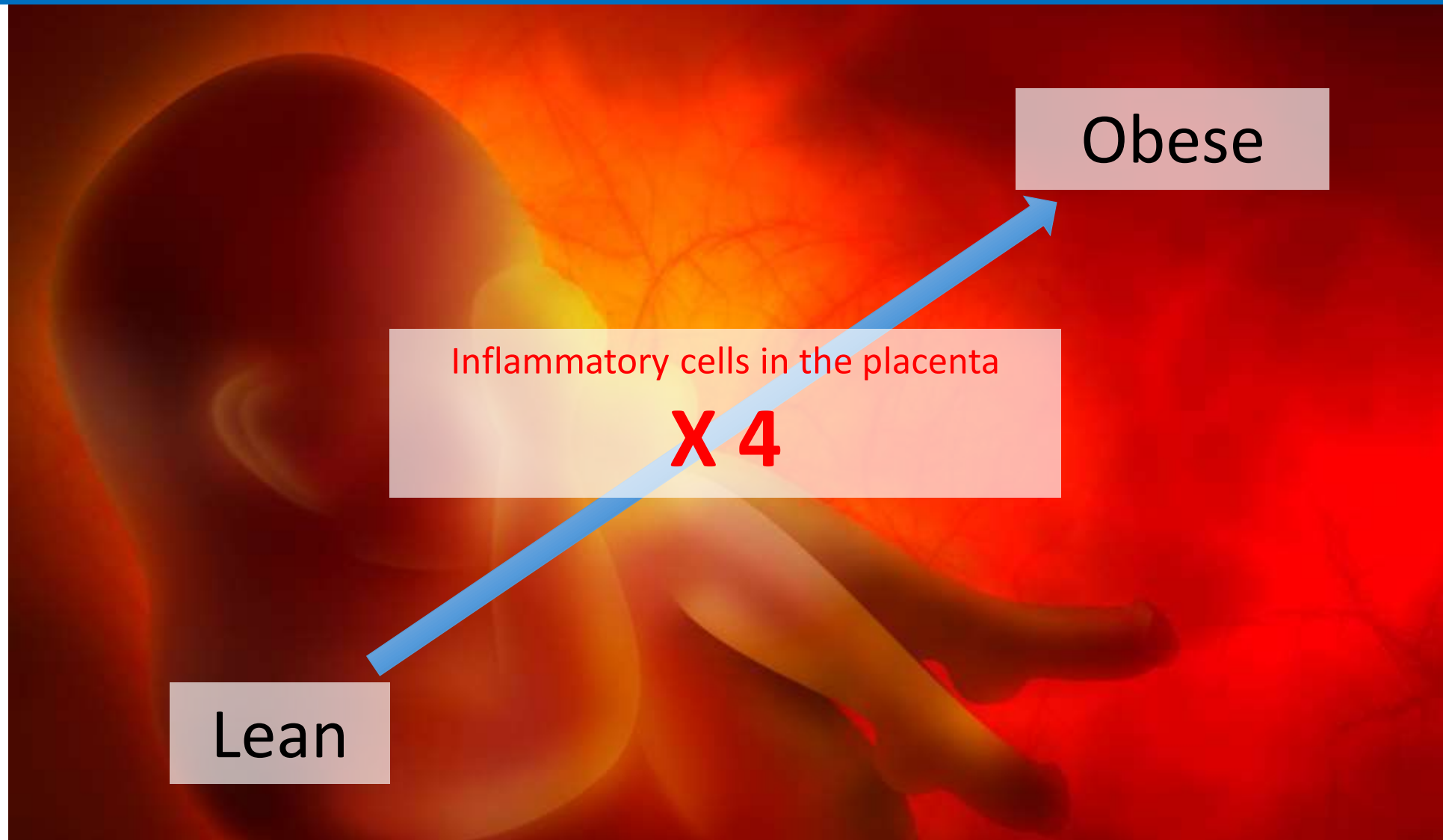


Overweight cat at mating = poor fertility



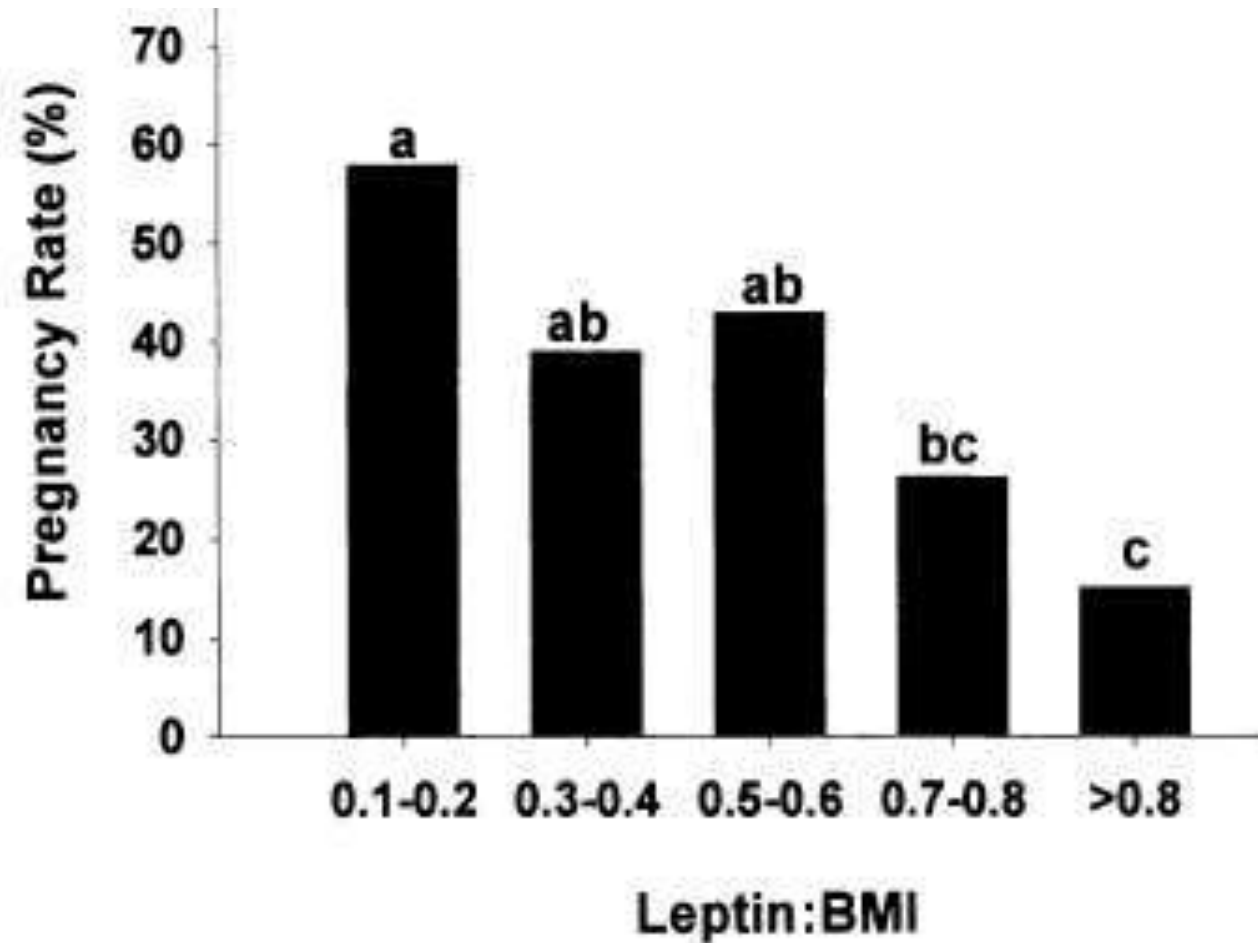


Obesity induces an inflammation of placenta in human



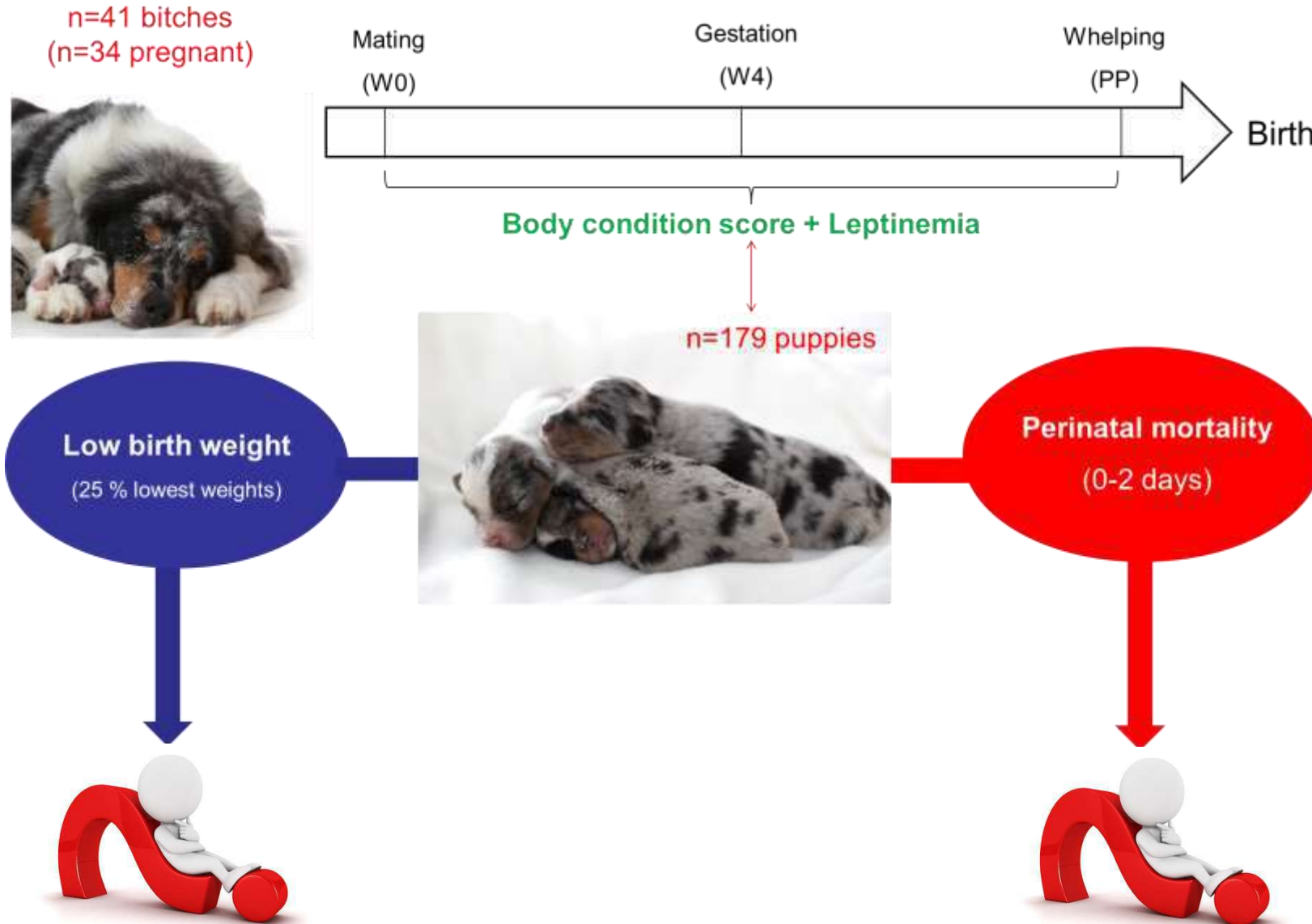
Challier JC. et al. Obesity in Pregnancy Stimulates Macrophage Accumulation and Inflammation in the Placenta. *Placenta*, 2008, 29 (3) : 274-281

Obesity decreases fertility in human



Brannian JD et al. Baseline non-fasting serum leptin concentration to body mass index ratio is predictive of IVF outcomes. Human reproduction, 2001, 16, 9 : 1819-1826

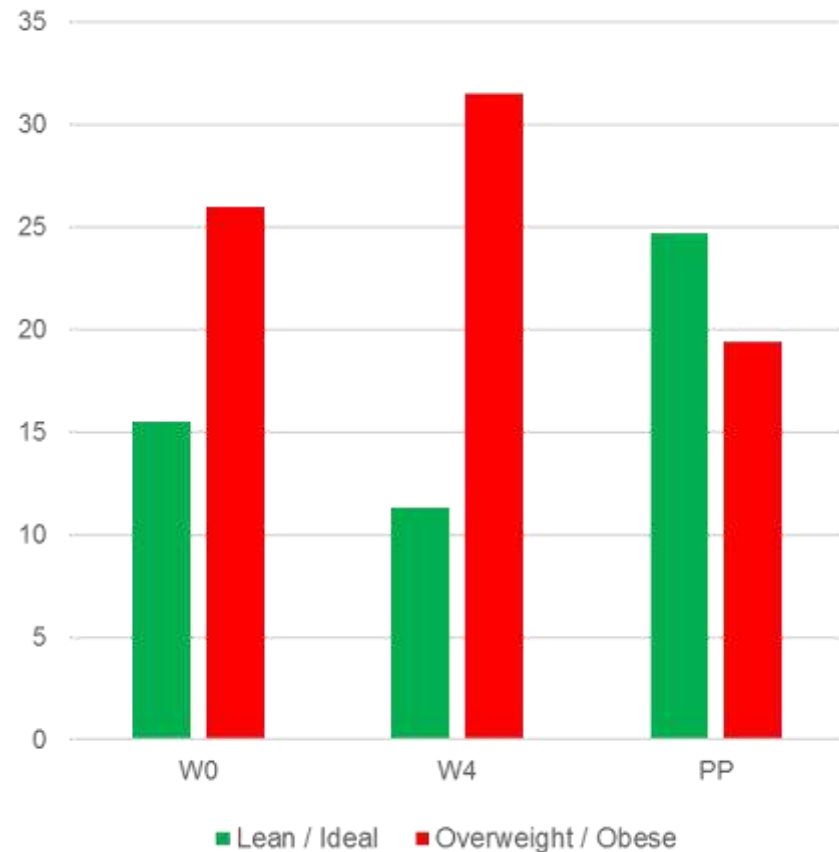
New study done in dog on BCS and reproduction



BCS influence prevalence of low birth weight and mortality

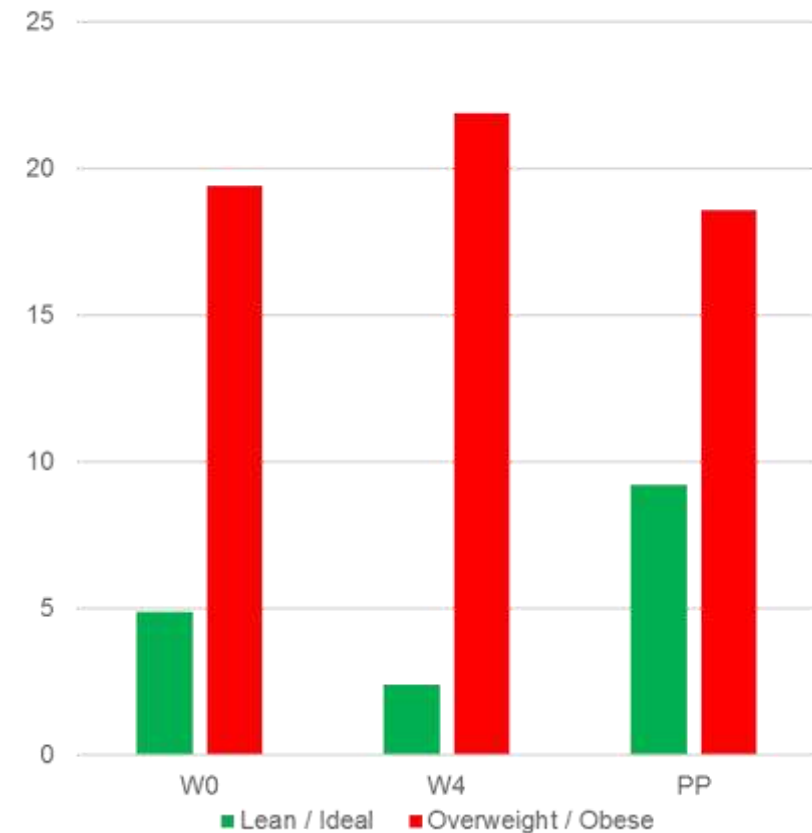
Prevalence of low birth weights 22,5 %

Low birth weight puppies (%)

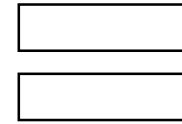
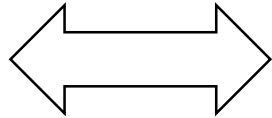


Perinatal mortality 25,1 %

Mortality (0-2 days) (%)



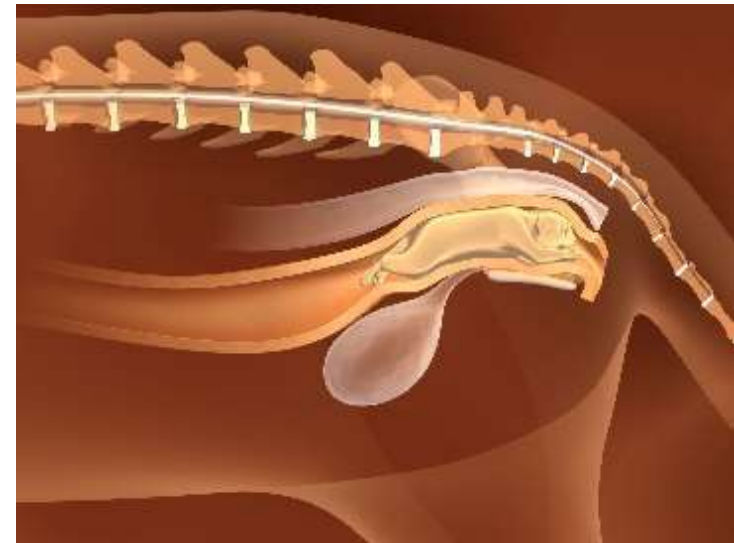
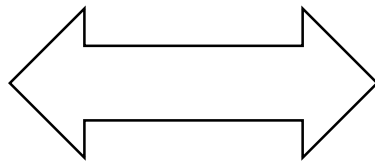
Overweight cat during gestation = poor fertility



Poor fertility

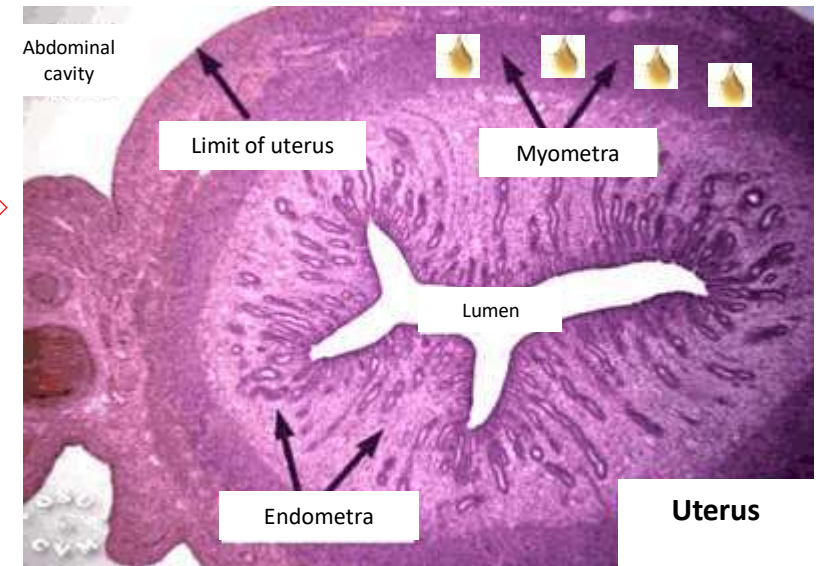
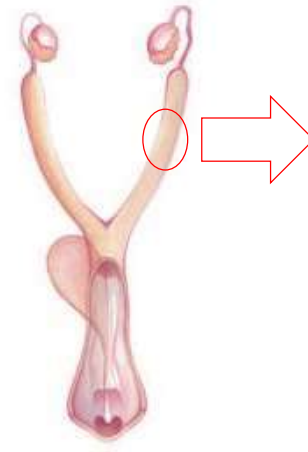
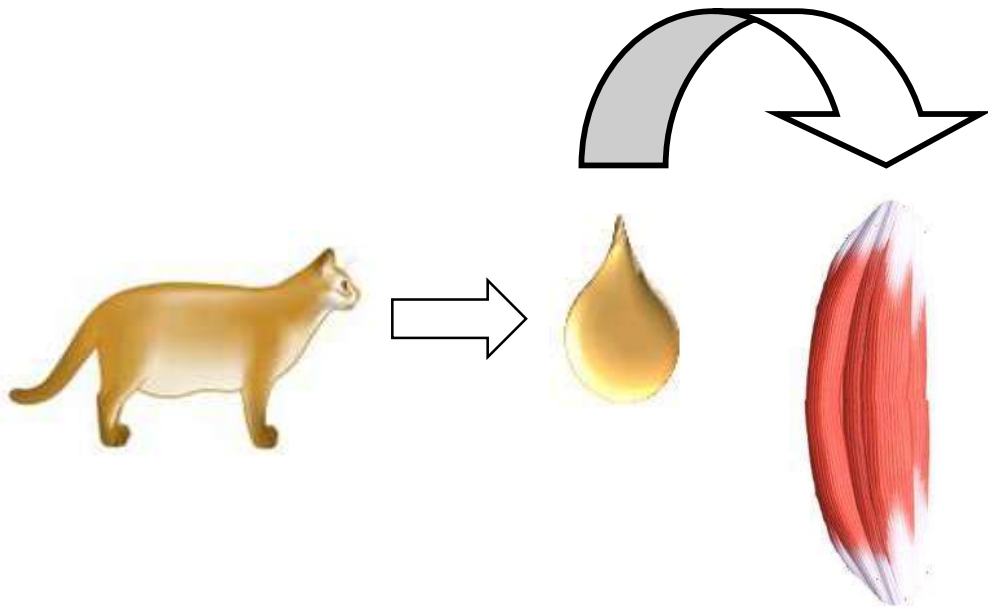
Low birth
weight kittens

Neonatal
mortality

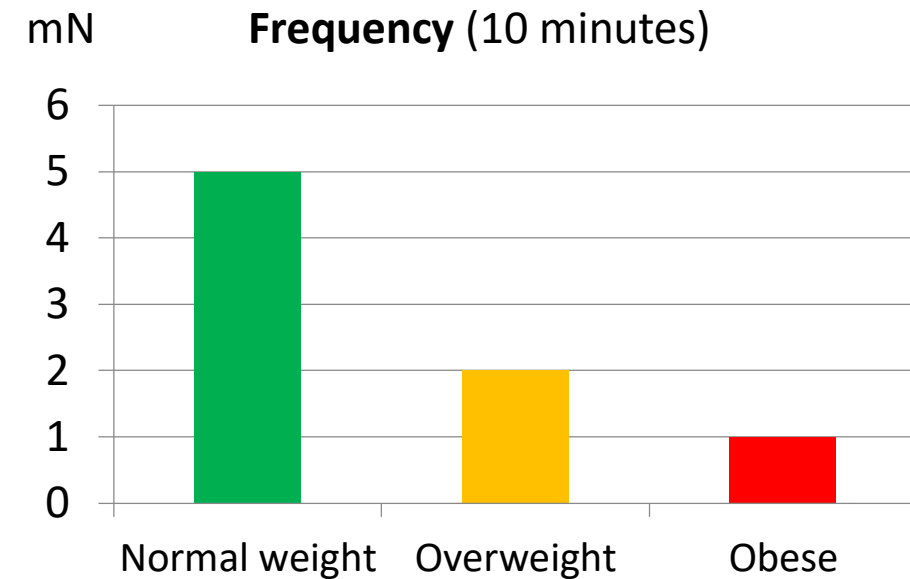
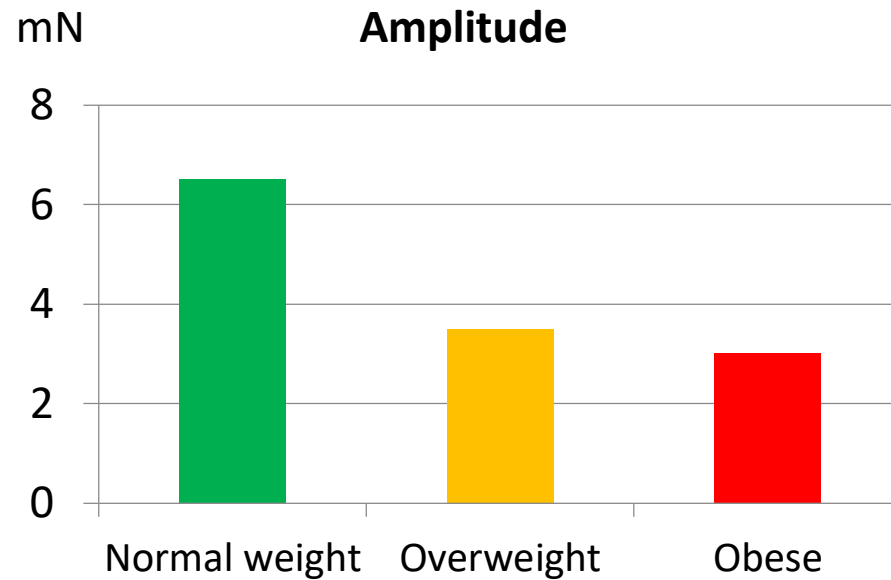
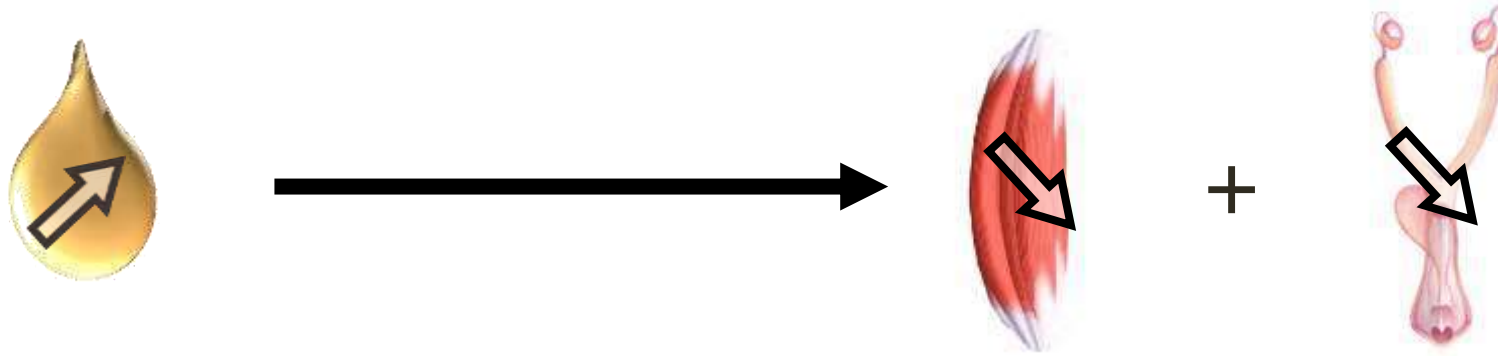


Overweight queens accumulate fat in the uterus

Uterus has a muscle : myometra

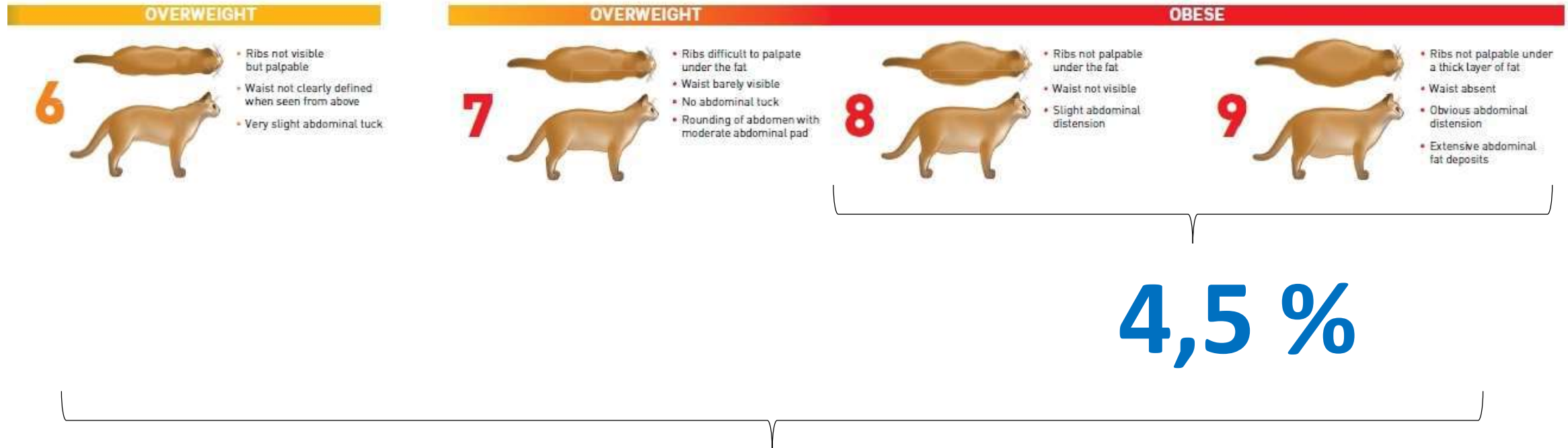


In overweight women, a diminution of myometra contraction is observed



Zhang J. et al. Poor uterine contractility in obese women. BJOG 2007;114:343–348

Overweight is frequent in pure breed cats



268 cats
22 breeds
2 cat shows

45,5 %

Corbee RJ (2013). Obesity in cat show. J Anim Physiol Anim Nutr (Berl). 2014 Dec;98(6):1075-80.

Assessment of body condition score before the mating



Only healthy queens in a good body condition score should be used for breeding

How to feed the cat during pregnancy ?



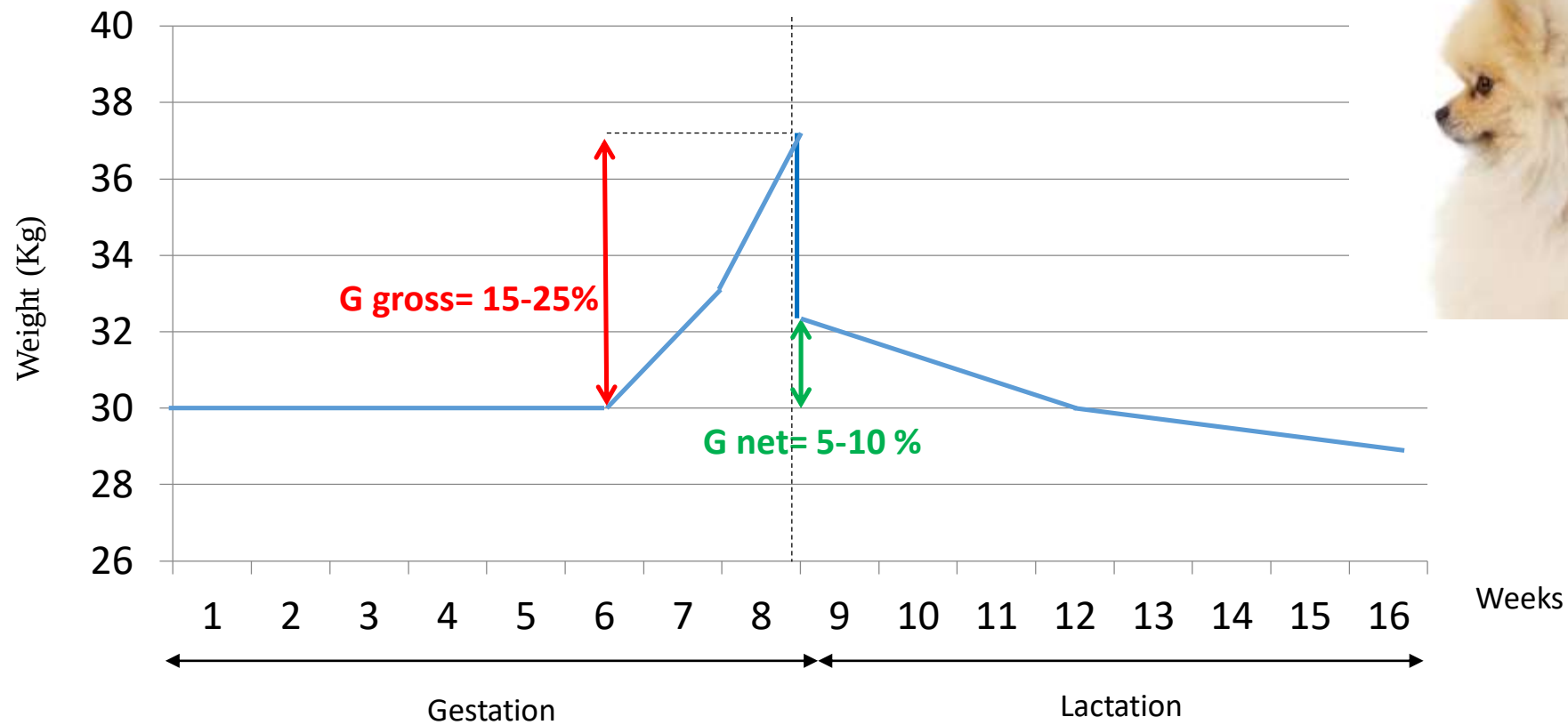
In Carnivores, there are two strategies to produce milk



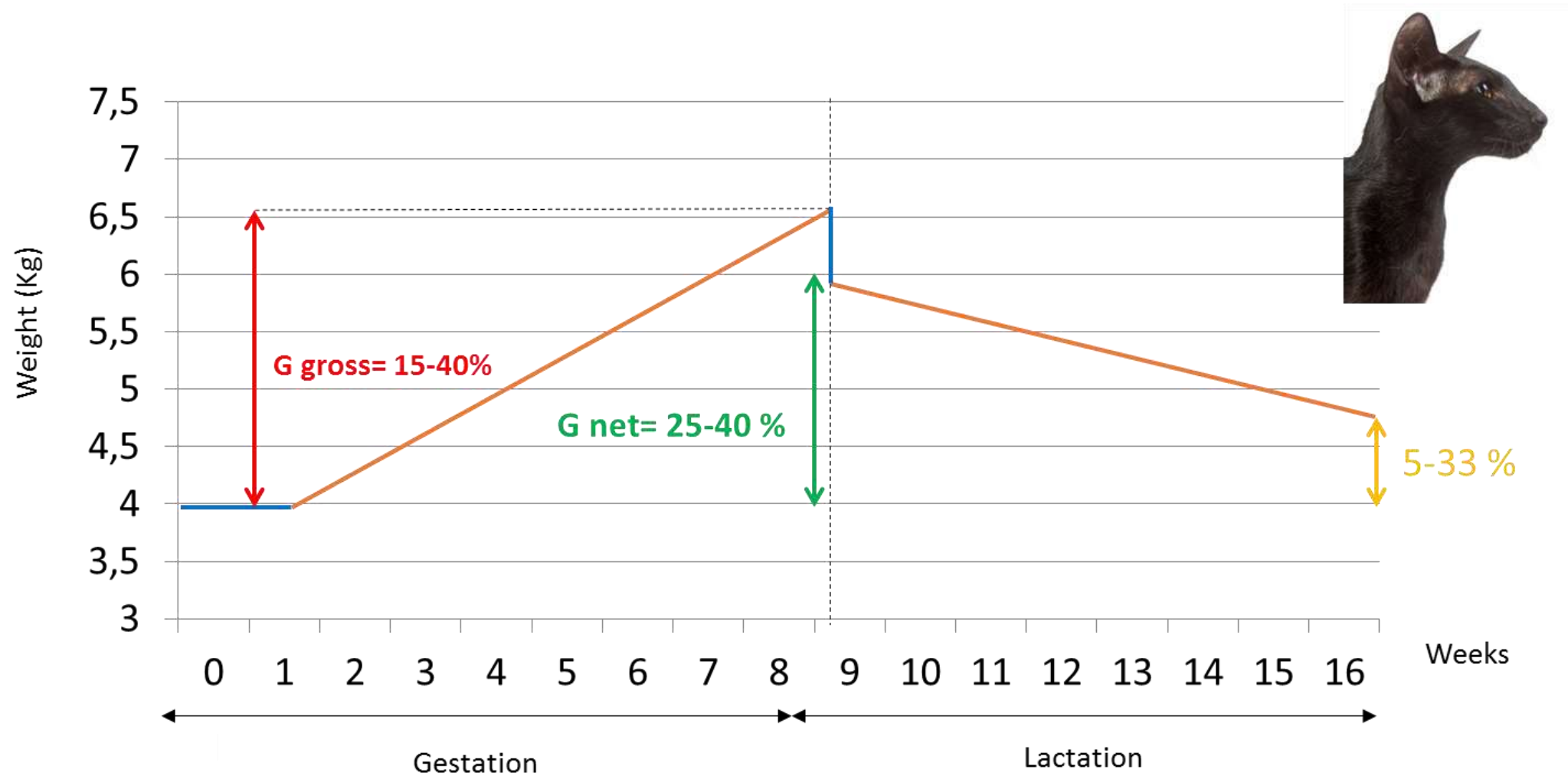
Optimal weight of pregnant bitch

G gross = weight (just before delivery) – Weight (pre-mating) = 15 – 25 %

G net = weight (post-delivery) – weight (post mating) = 5 – 10 %

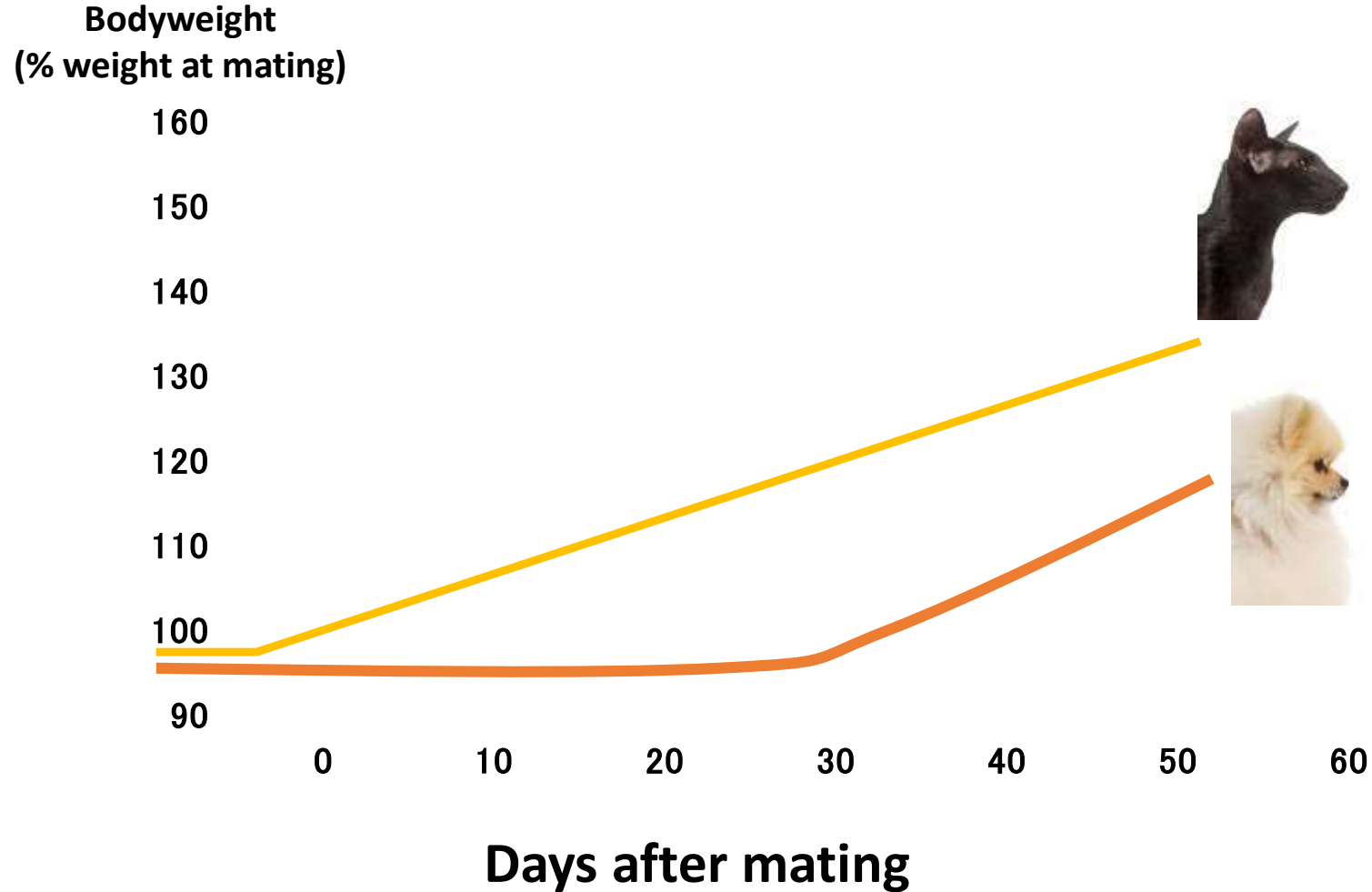


Optimal weight of pregnant queen



Wichert D et al . Cats during gestation and lactation fed with canned food ad libitum: energy and protein intake, development of body weight and body composition. JAPAN 2011

Dogs and cats two strategies during pregnancy



In Carnivores, there are two strategies to produce milk



Energy comes
only
from food

**Few energy
reserve**



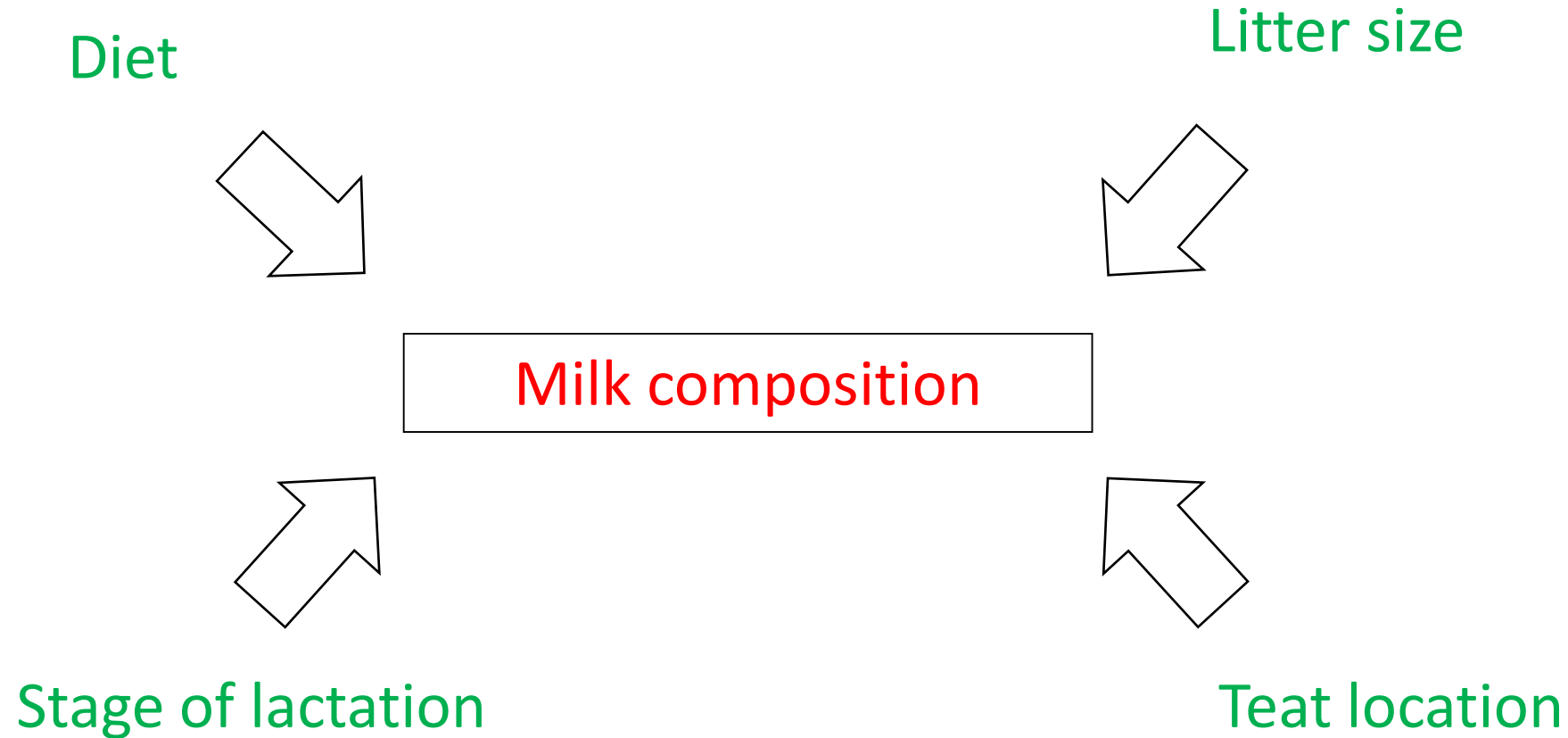
**More energy
reserve**

Energy comes
from body
fat deposit
& food

Is it possible to modulate milk composition with nutrition during gestation ?

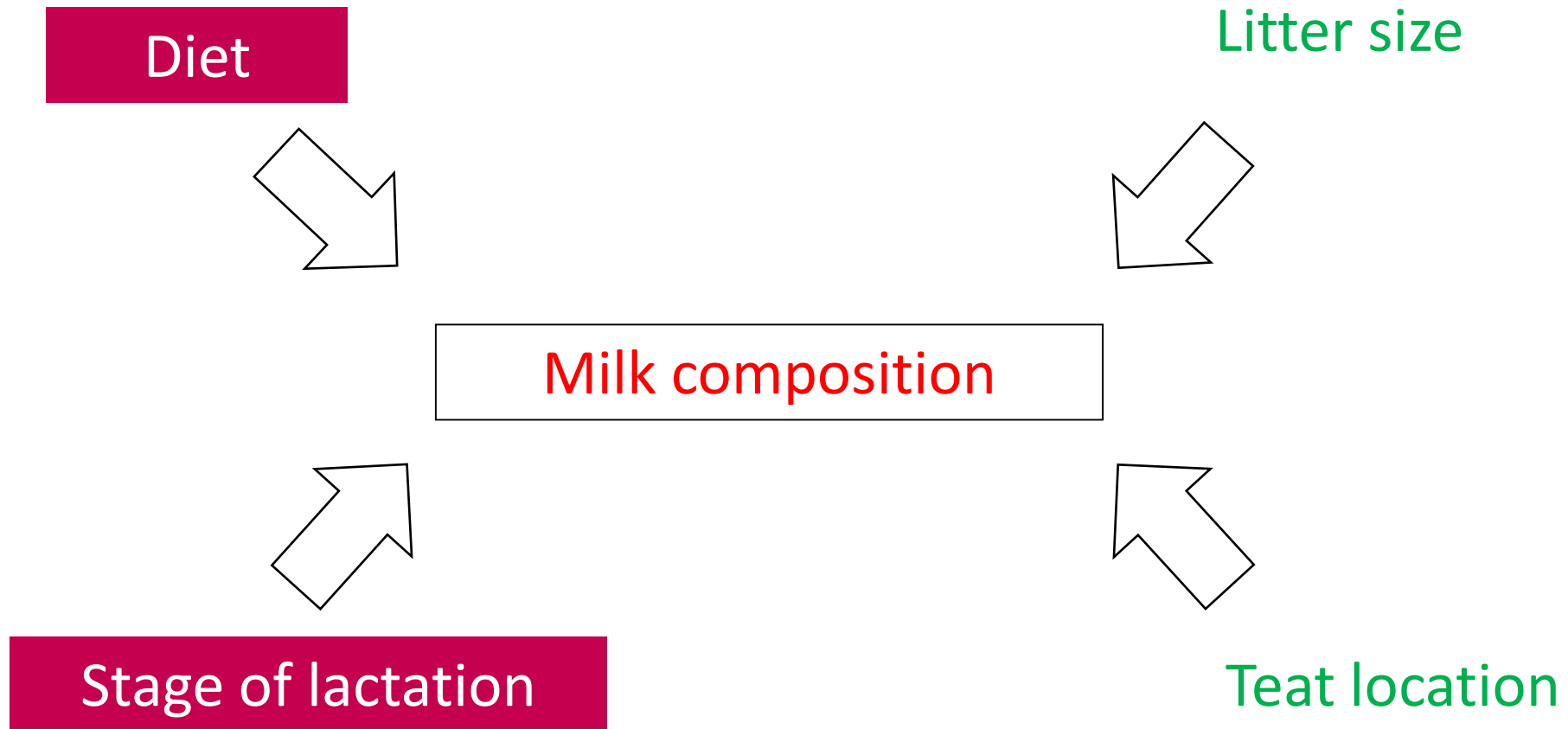


Four different factors influence the composition of domestic cat milk

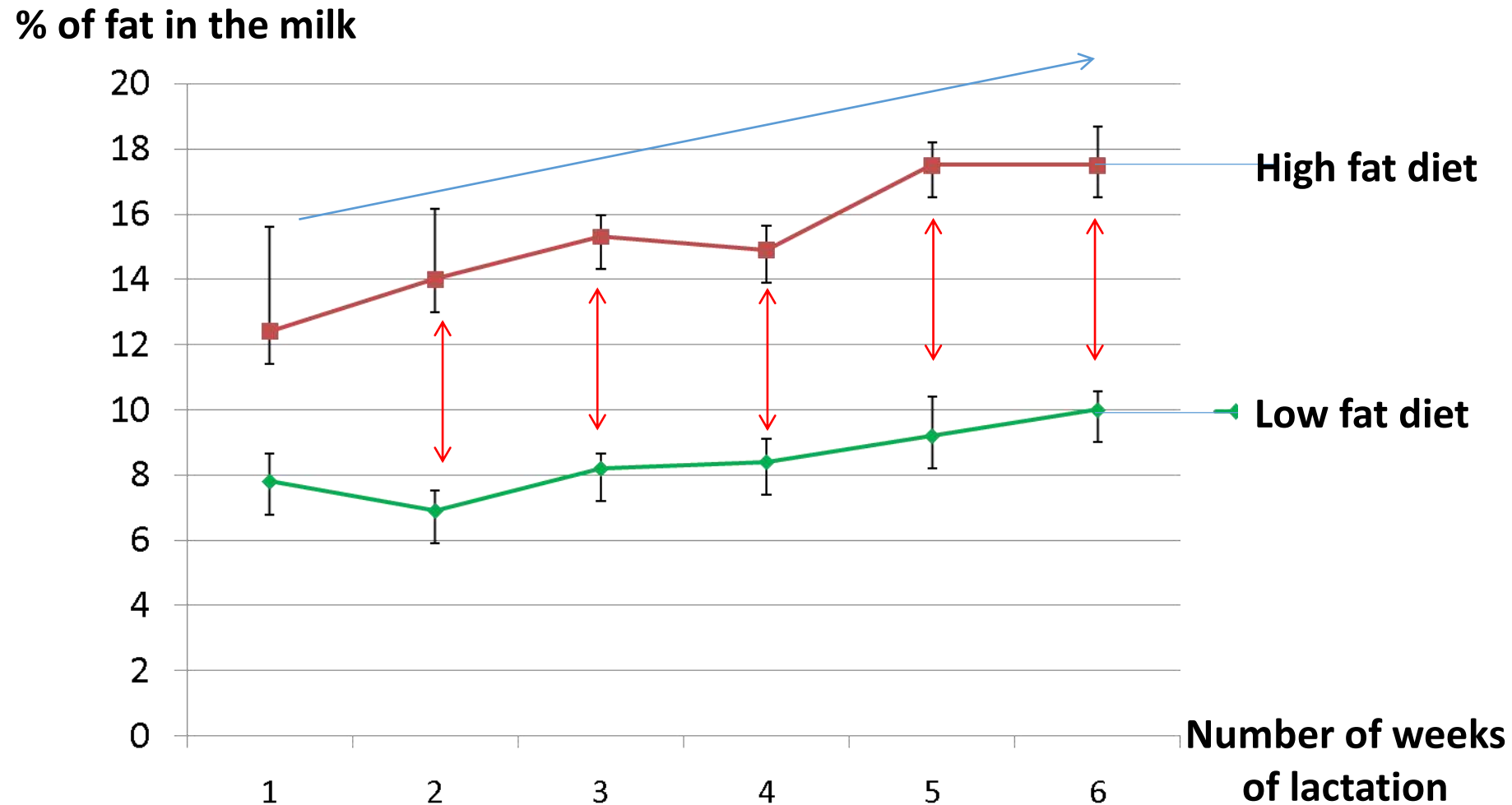


Jacobsen KL. et al. Influences of stage of lactation, teat position and sequential milk sampling on the composition of domestic cat milk (*Felis catus*). J. Anim. Physiol.a. Anim. Nutr. 88 (2004), 46-58

Four different factors influence the composition of domestic cat milk



Diet and number of weeks of lactation have an impact on the composition of cat milk



Use specific diet dedicated for gestation and/or lactation



388,5 g of fat / 1000 Kcal



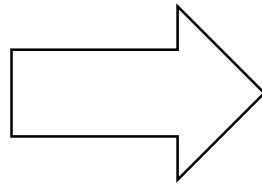
549,2 g of fat / 1000 Kcal

Do we need to give supplements of the queen during gestation ?



Eclampsia

Low blood
Calcium
concentration



Clinical signs in case of eclampsia

Muscle tremors, fasciculations

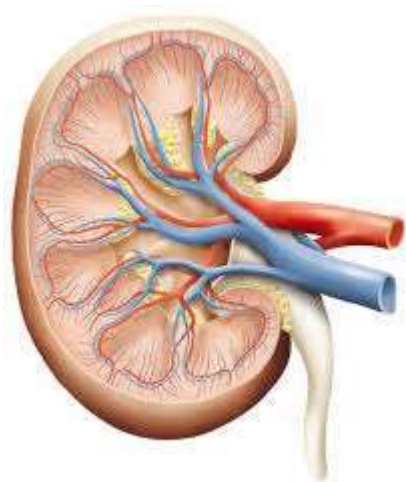
Generalized seizures

Muscle cramping or pain

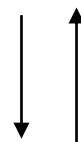
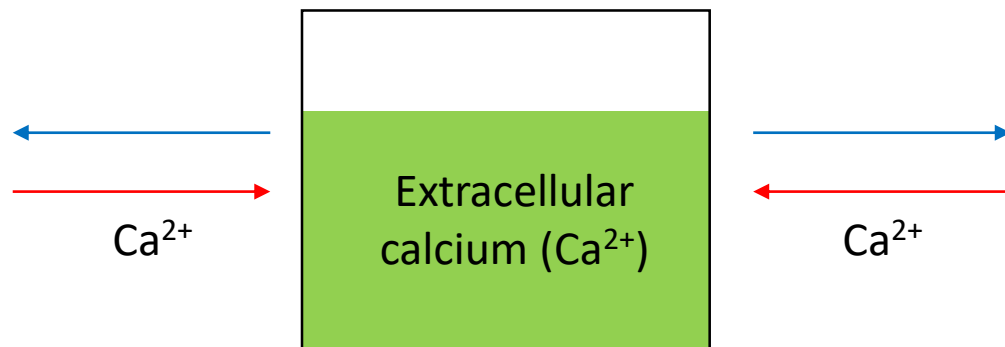
Behavior changes

Poor activity

**Parathyroid
hormone
(PTH)**

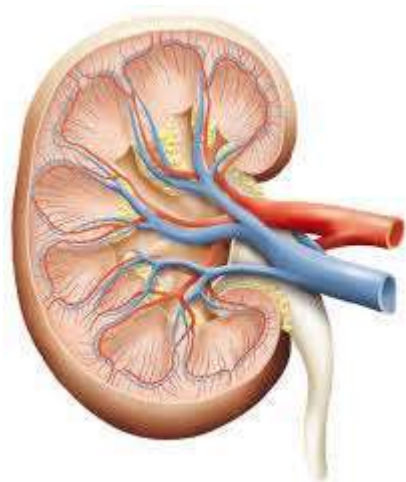


Ca^{2+}



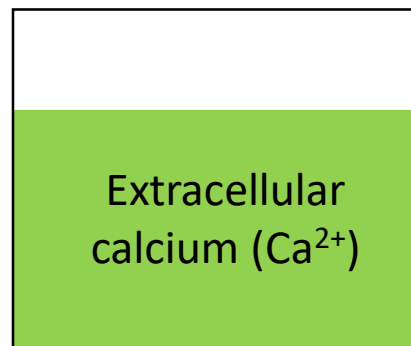
Soft tissu calcium

Parathyroid
hormone
(PTH)



Ca^{2+}

Ca^{2+}



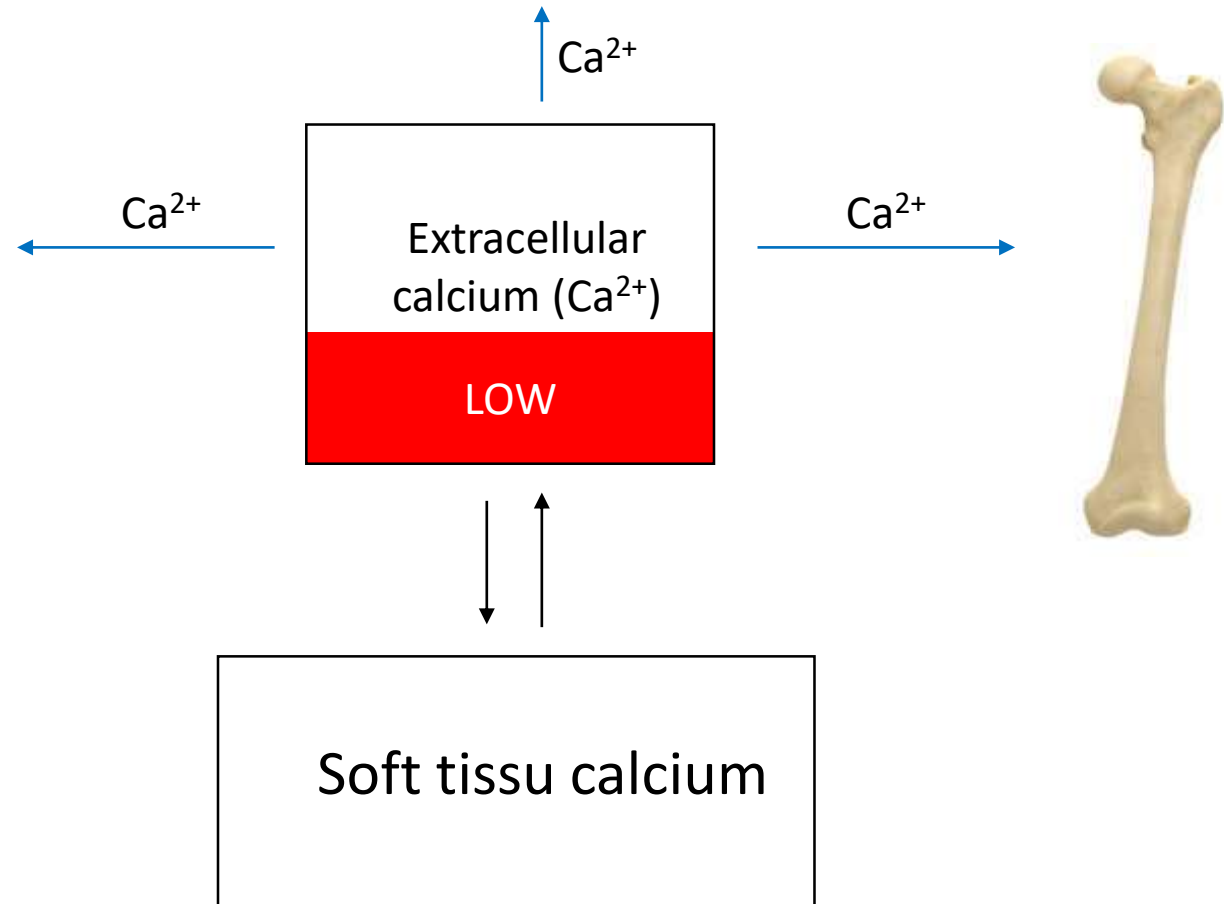
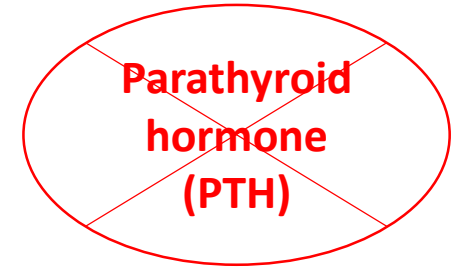
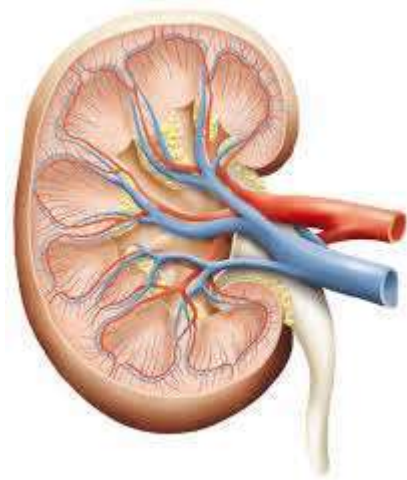
Ca^{2+}



Lactation

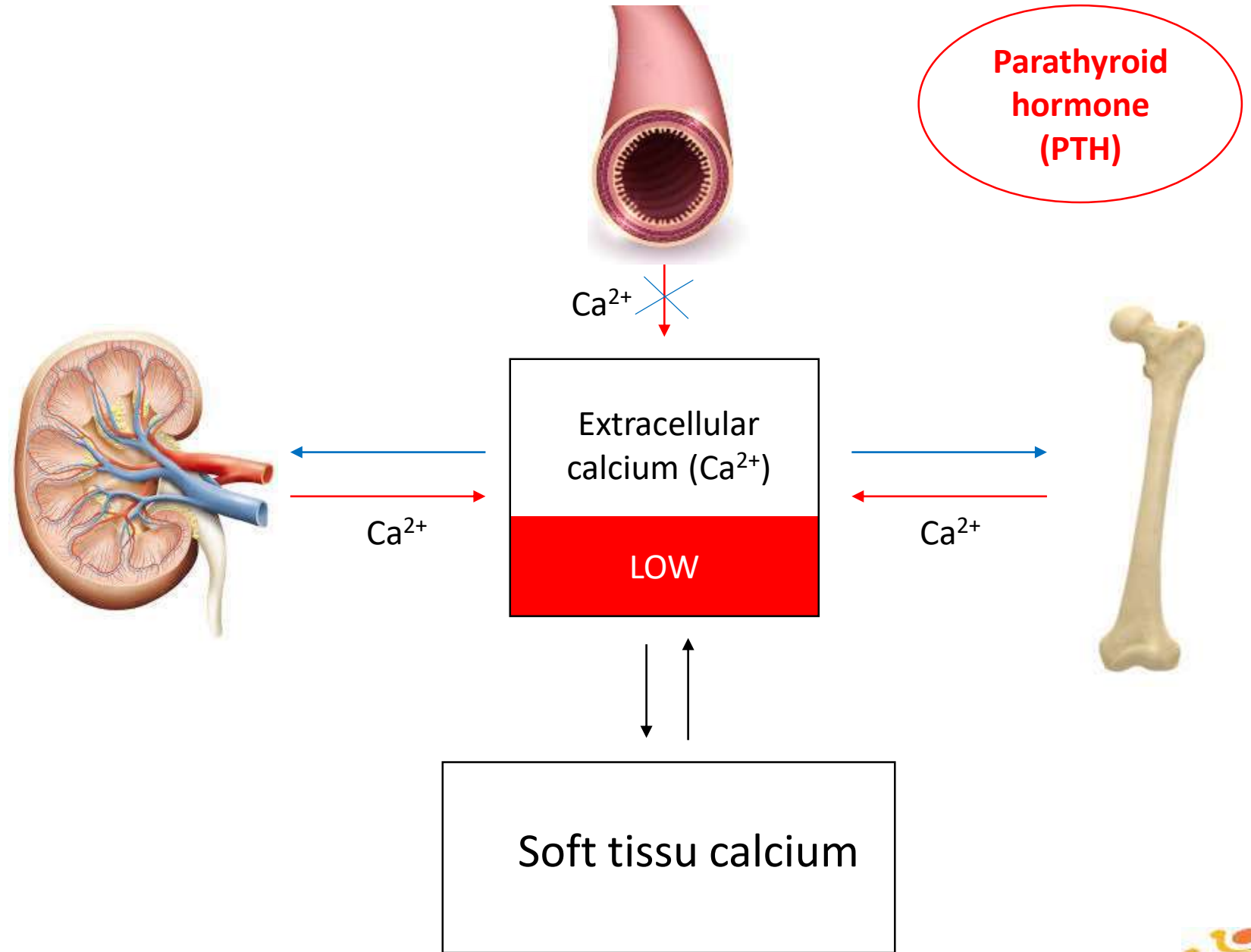
Risk factors of eclampsia

- 1- Calcium supplementation during gestation



Risk factors of eclampsia

- 1- Calcium supplementation during gestation
- 2-Low quality diet
- 3-High quantity of legumes (phytates)

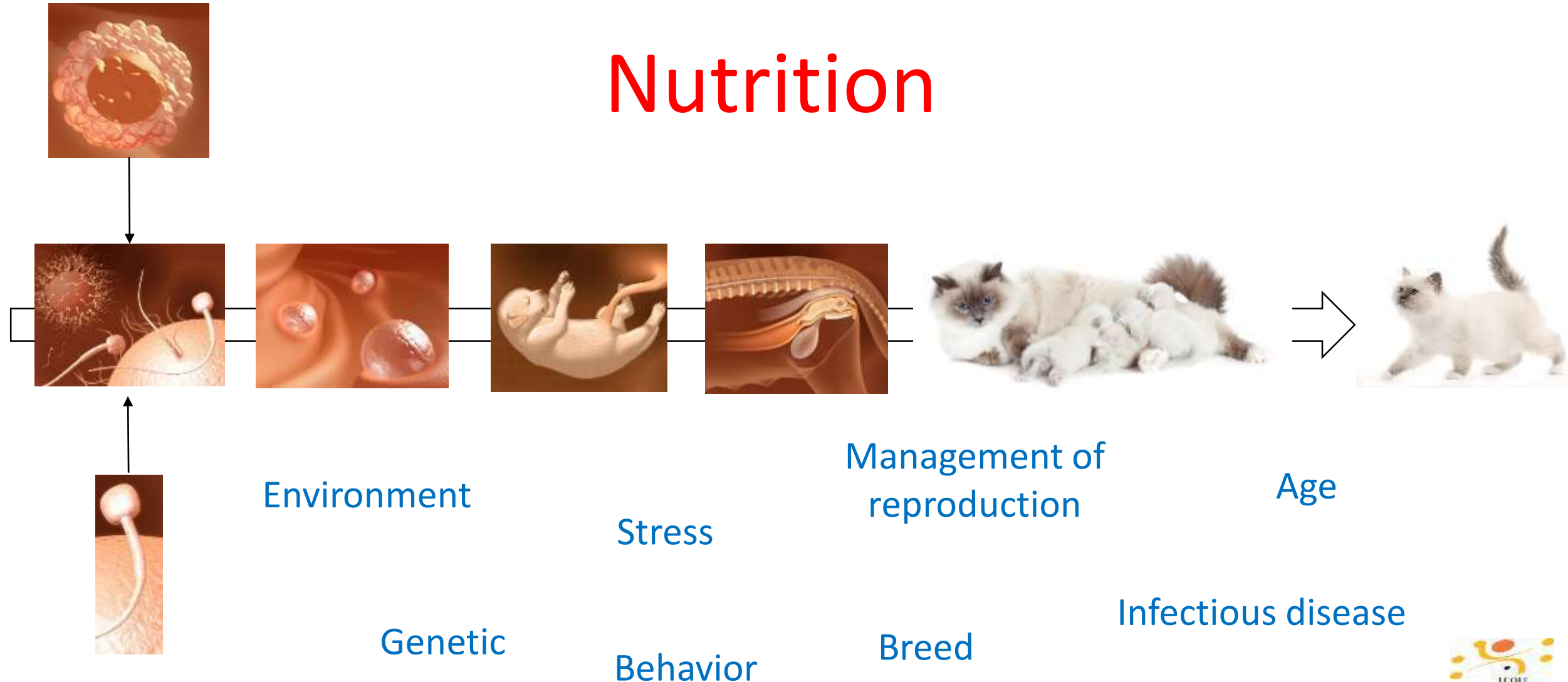


Prevention of eclampsia

High quality balanced diet

No calcium supplementation during gestation

Good breeding performances if.....



How to optimize breeding performances

Optimal kennel management + Optimal nutrition = Best results