

ORIGINE : MICROBIOTE RUMINAL ET DIARRHÉE ?

LAURIANNE VOLAND



INRAE



HoloRuminant
Understanding microbiomes of the ruminant holobiont

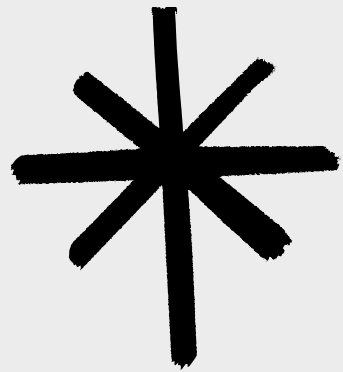
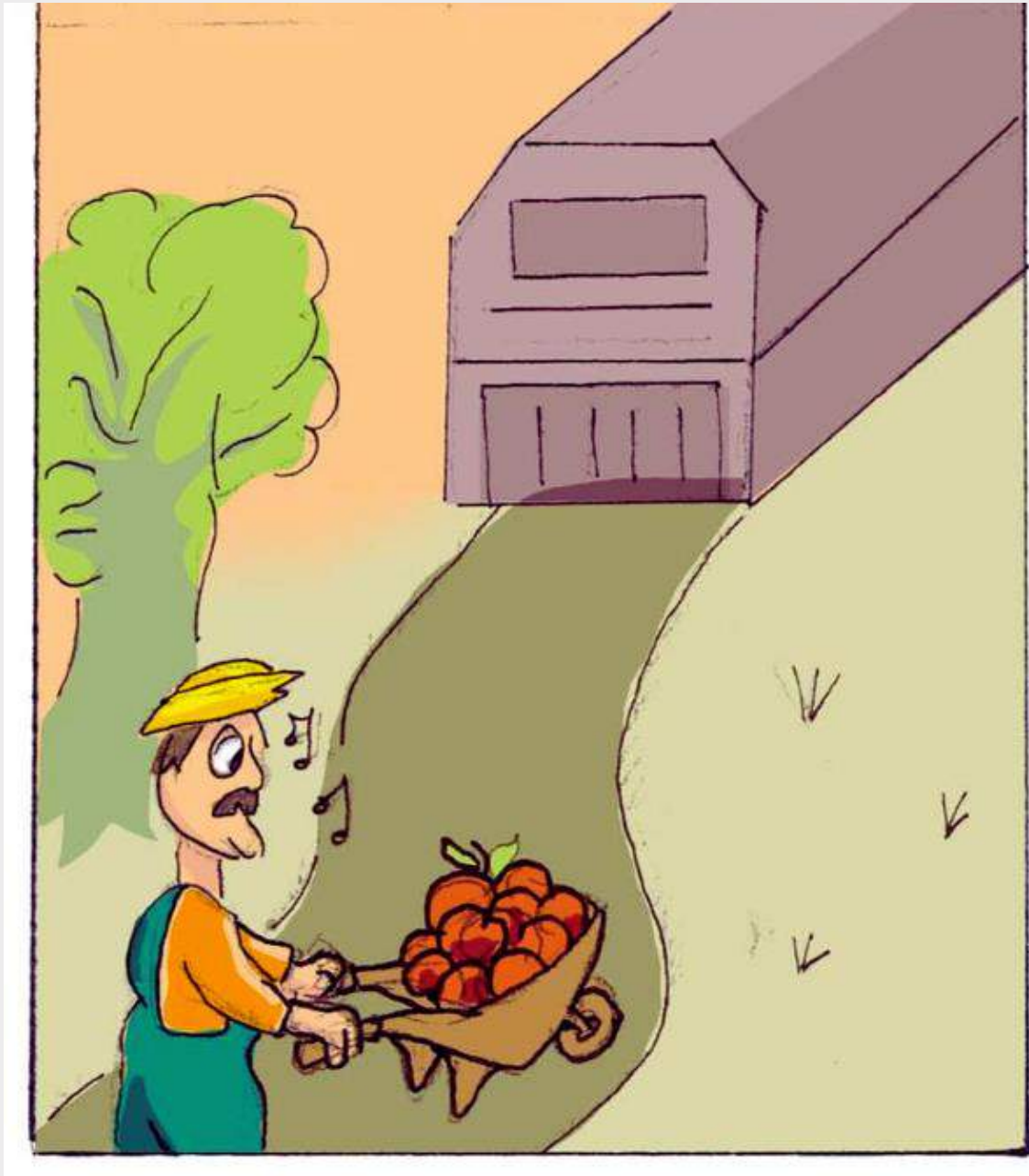
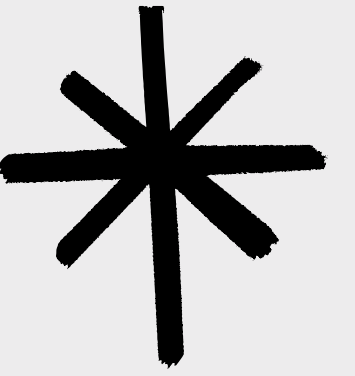


UCA
UNIVERSITÉ
Clermont
Auvergne

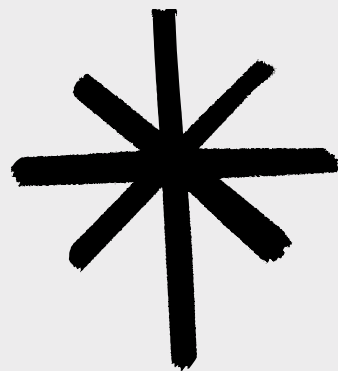
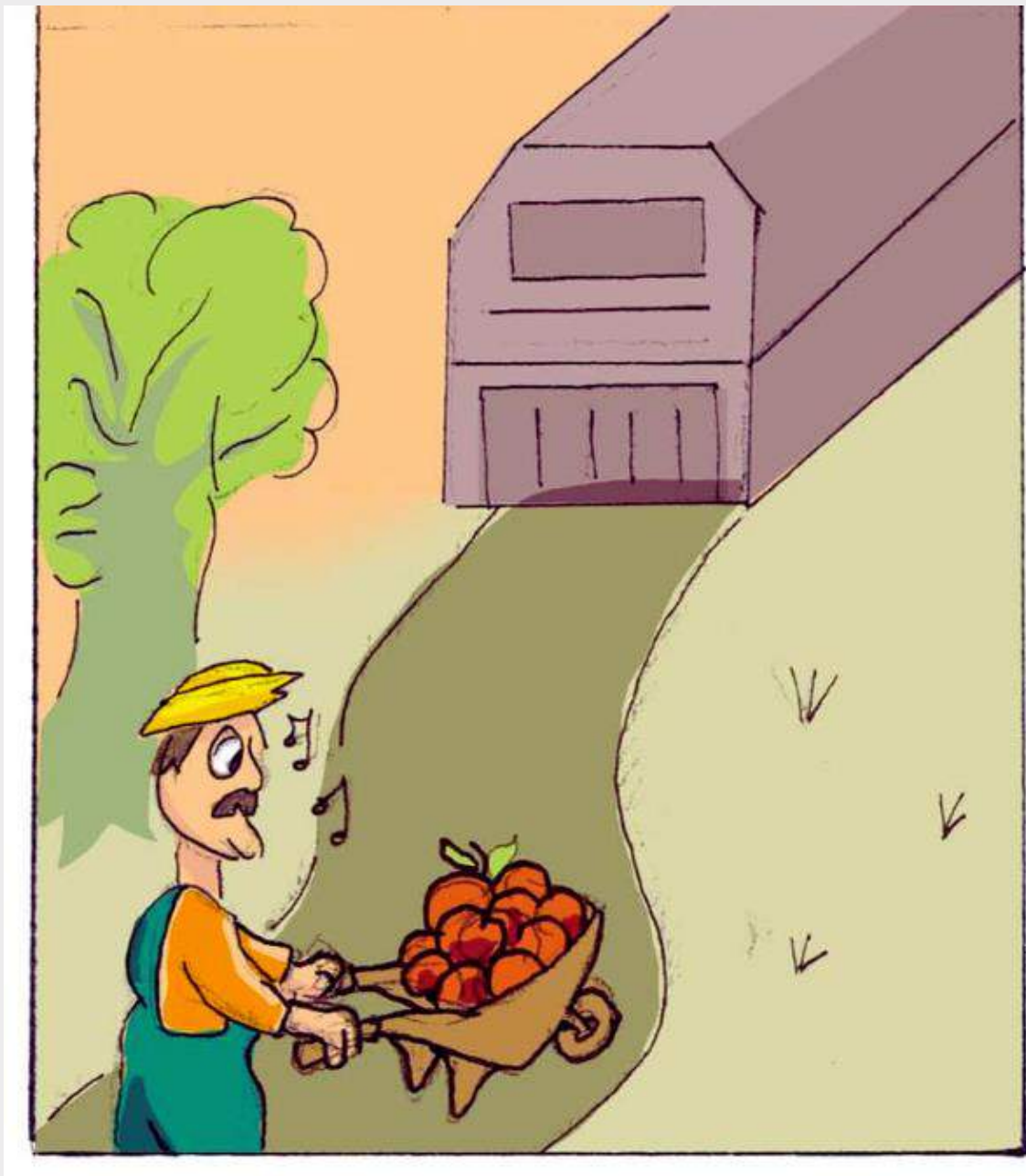
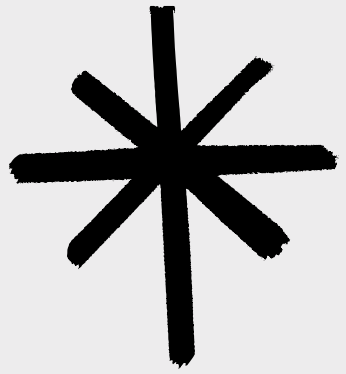
UCA
ÉCOLE DOCTORALE
DES SCIENCES DE LA VIE,
SANTÉ, AGRONOMIE
ENVIRONNEMENT

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000213

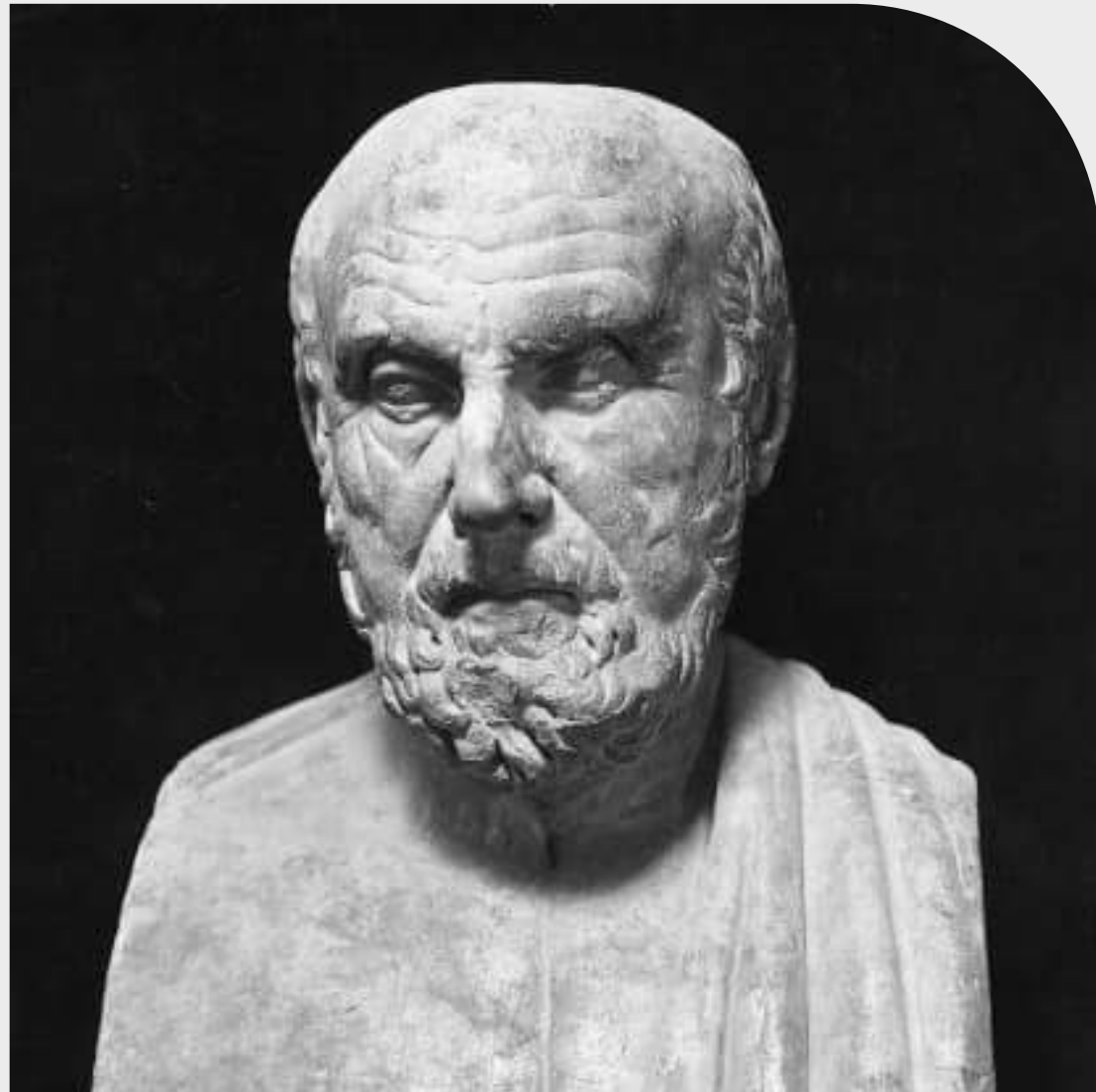
L'HISTOIRE DE LA FERME DE DEDE



L'HISTOIRE DE LA FERME DE DEDE



HYPPOCRATE



“Toutes les maladies
commencent dans
l'intestin.”

“All disease begins in the gut.”

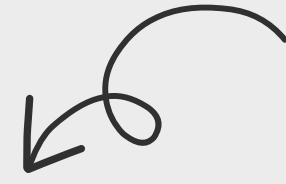
MONOGASTRIQUE



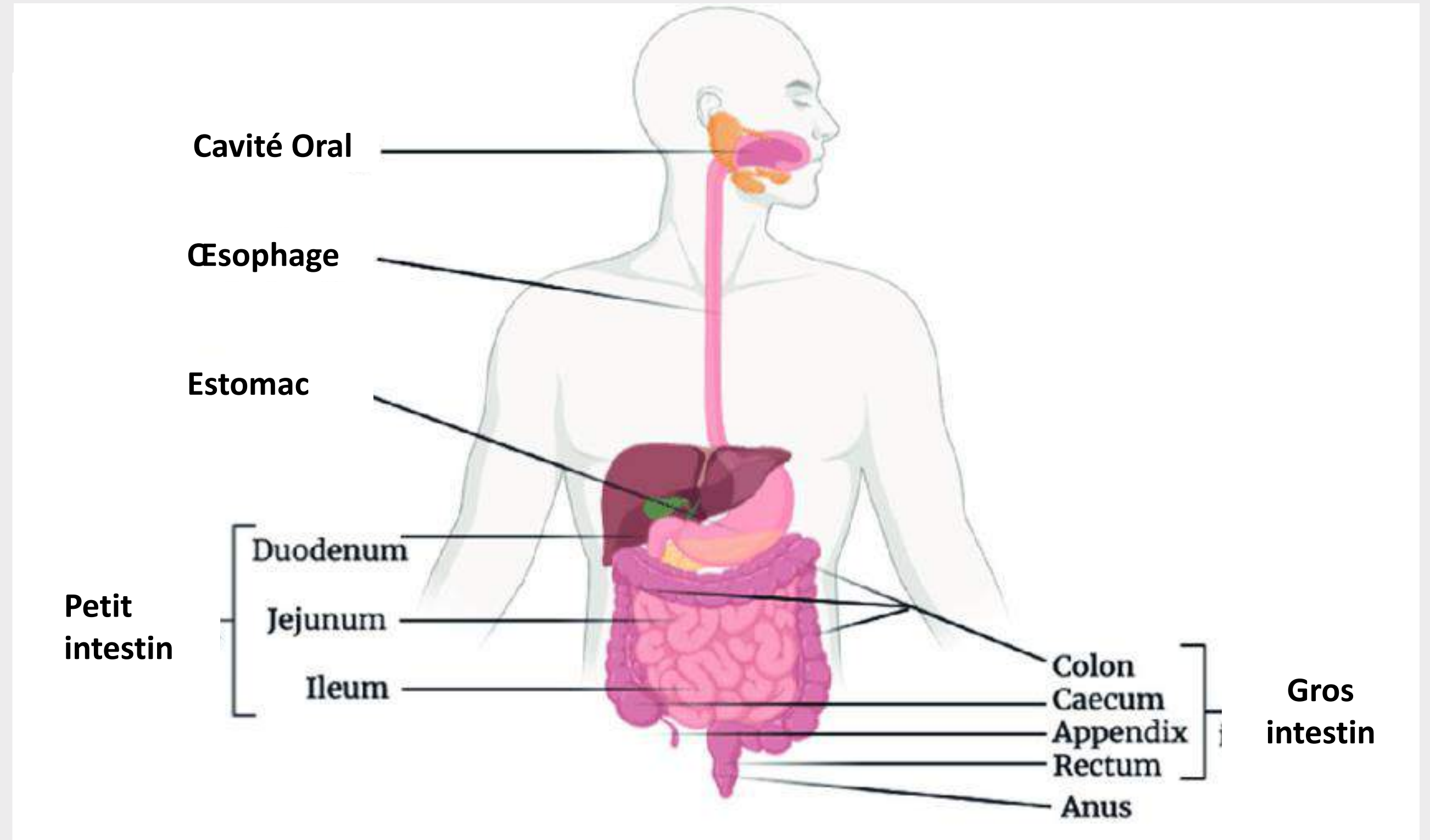
**TRACTUS
INTESTINAL**



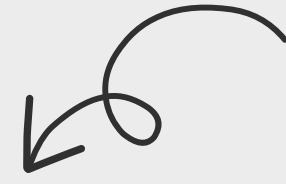
TRACTUS INTESTINAL



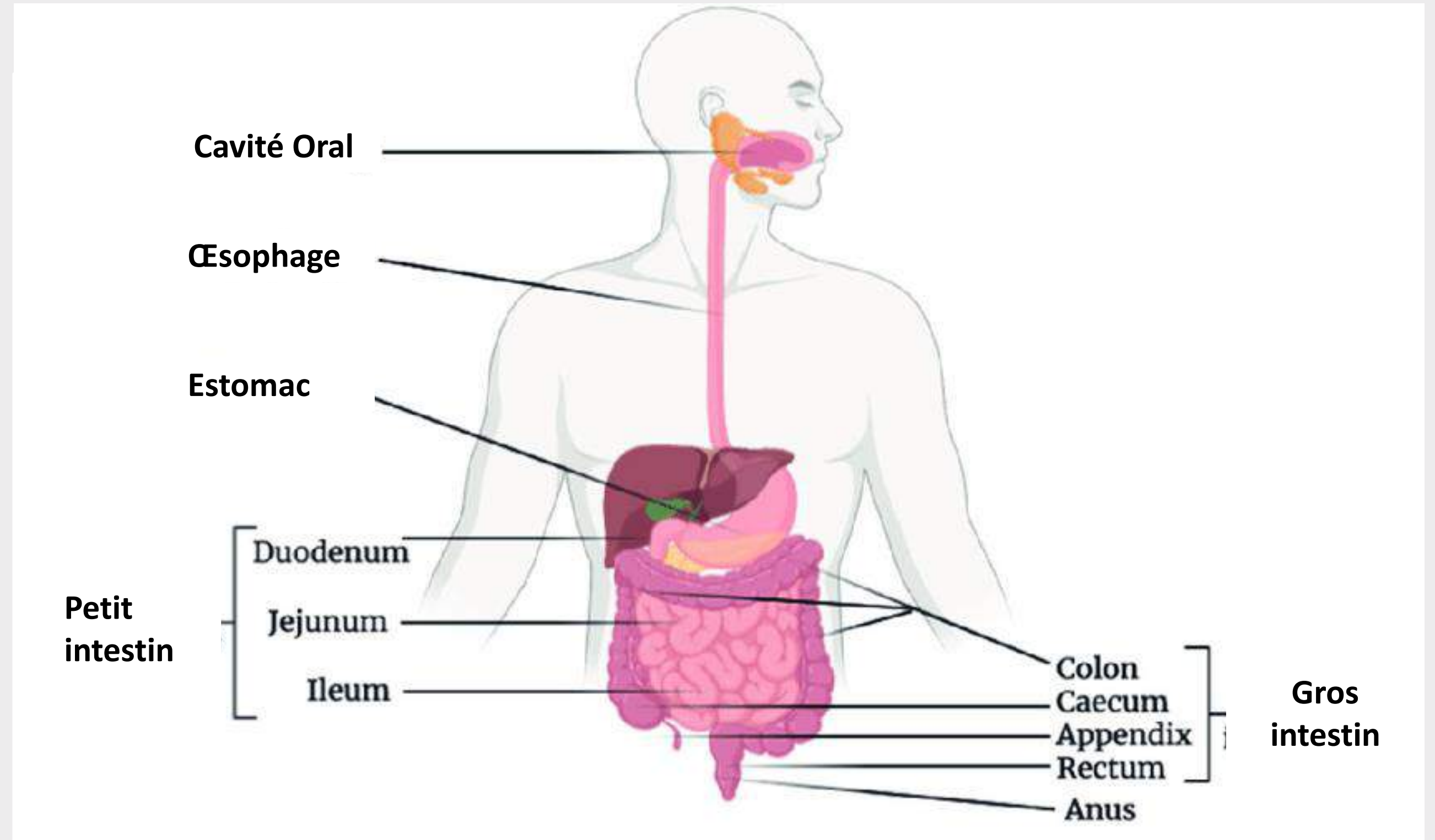
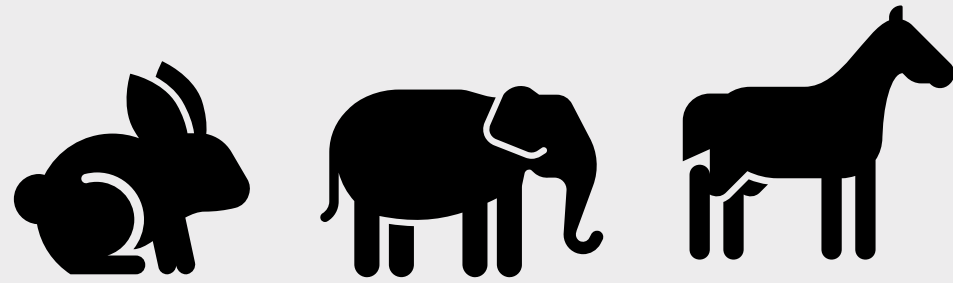
MONOGASTRIQUE



TRACTUS INTESTINAL

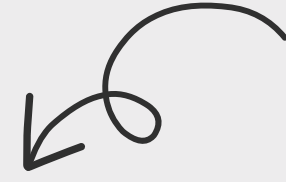


MONOGASTRIQUE



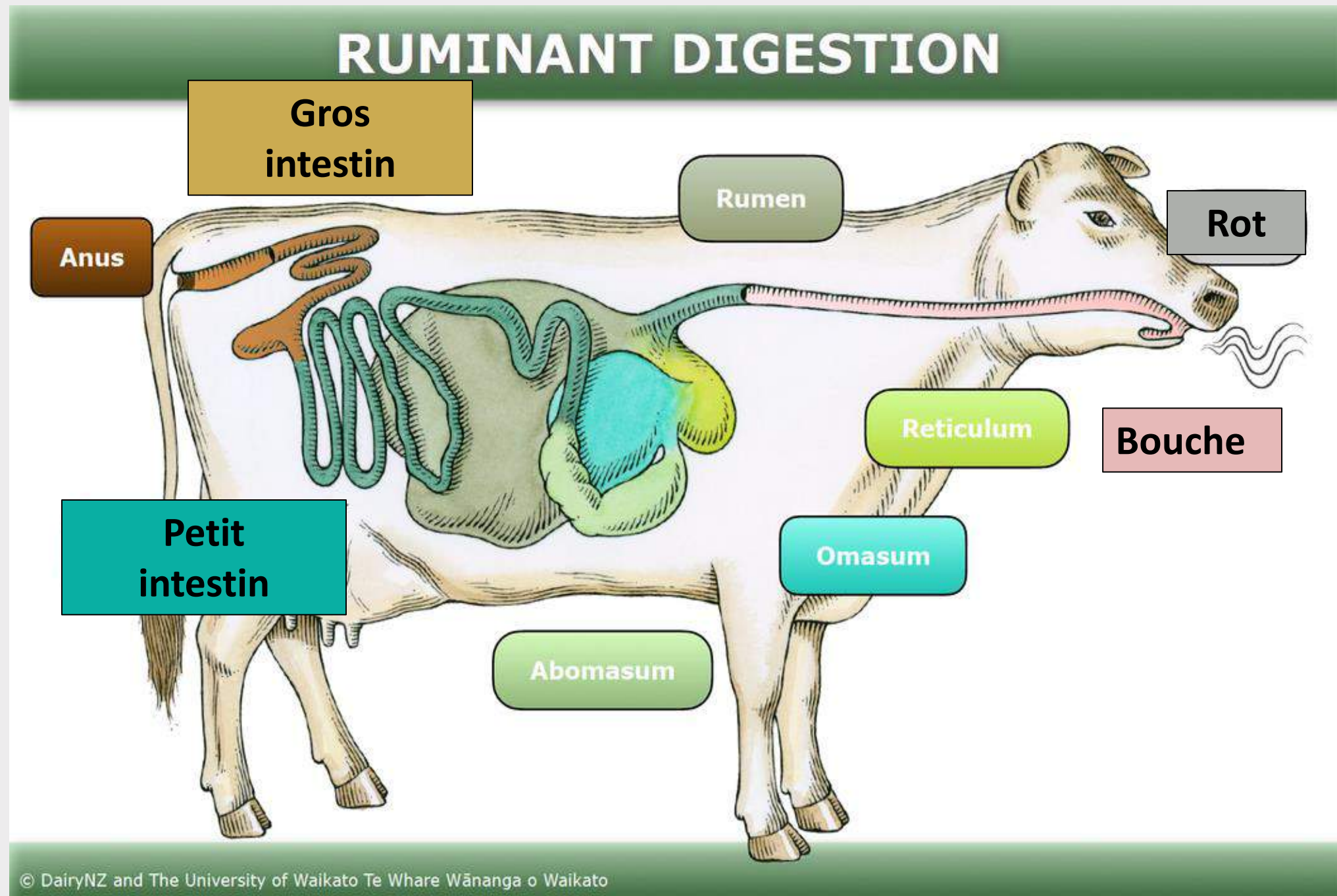
TRACTUS
INTESTINALE

PLURI-GASTRIQUE



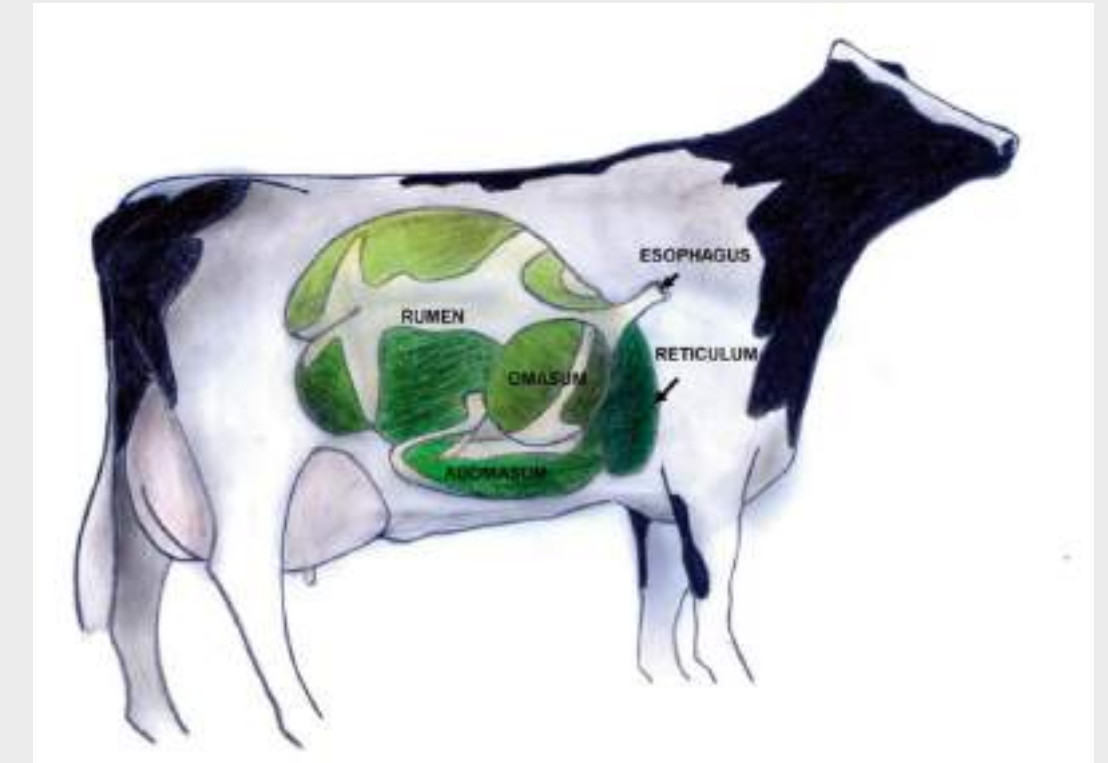
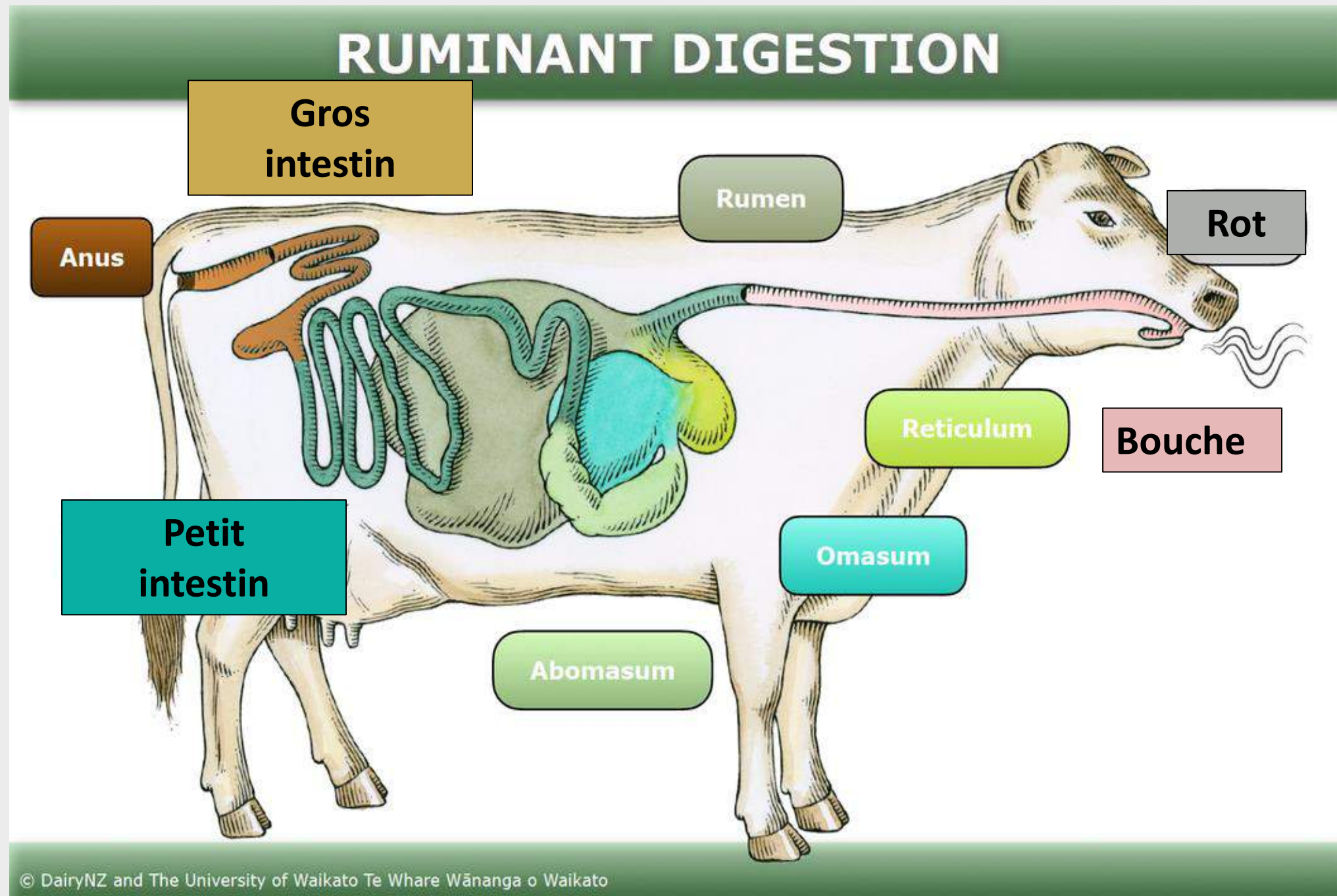
TRACTUS INTESTINALE

PLURI-GASTRIQUE



TRACTUS INTESTINALE

PLURI-GASTRIQUE



Pseudo-ruminants :
chameaux, lamas, alpagas

Ruminants :
bovins, ovins, caprins, cerfs, girafes,
rennes, élans, cerfs, chevreuils et
antilopes

RUMEN



L'immunité de l'hôte
(cytokines, anticorps...)

RUMEN

La nutrition



L'immunité de l'hôte
(cytokines, anticorps...)

RUMEN

La nutrition

Le développement physiologique (les acides gras volatils) : Source d'énergie pour les ruminants (50/70%)



L'immunité de l'hôte (cytokines, anticorps...)

RUMEN

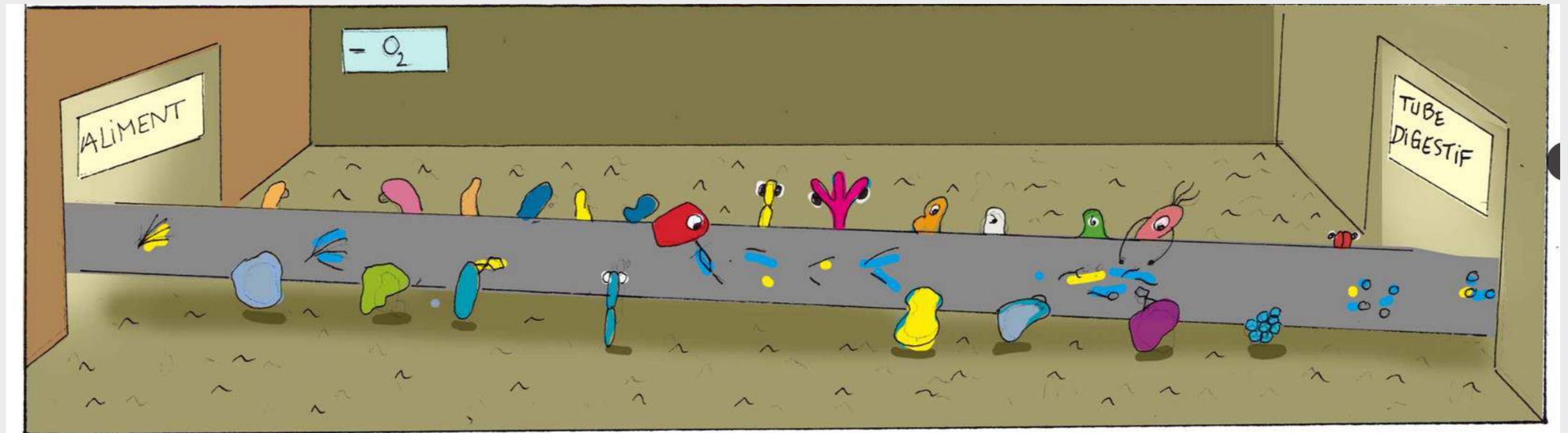
La nutrition

Le développement physiologique (les acides gras volatils) : Source d'énergie pour les ruminants (50/70%)

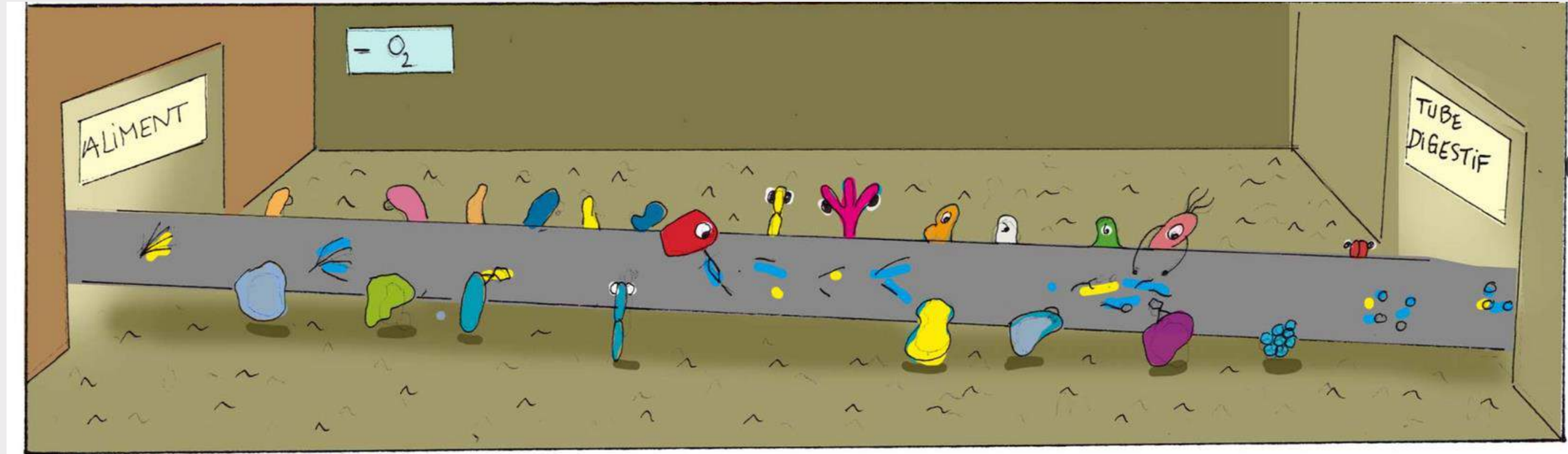


L'immunité de l'hôte (cytokines, anticorps...)

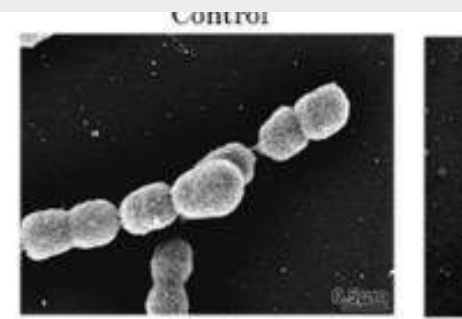
Chambre de fermentation microbienne
: Fermenter les fibres alimentaires



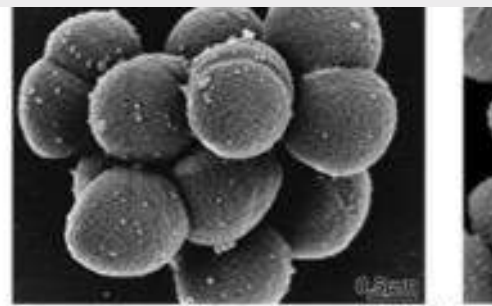
RUMEN



Bacteria



Ruminococcus flavefaciens



Megasphaera elsdenii

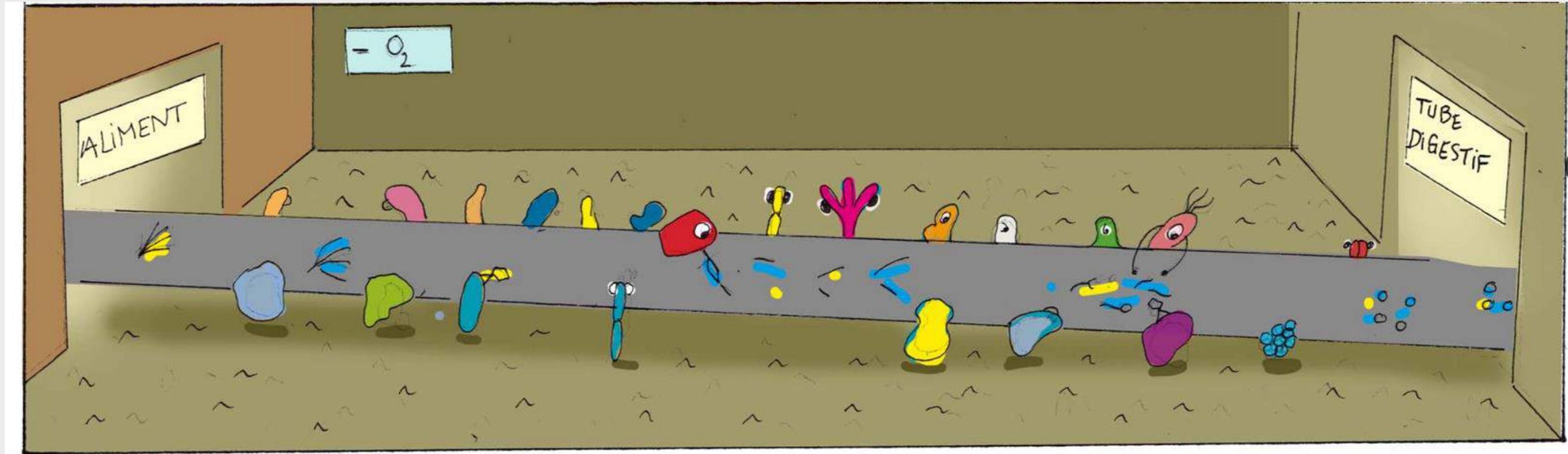


Butyrivibrio fibrisolvens

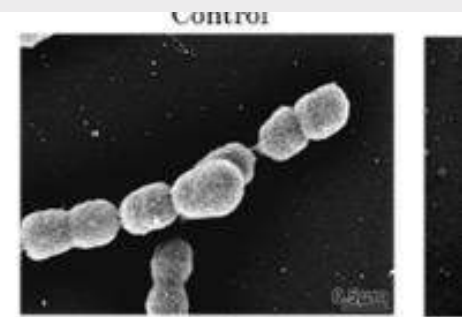


Selenomonas ruminantium

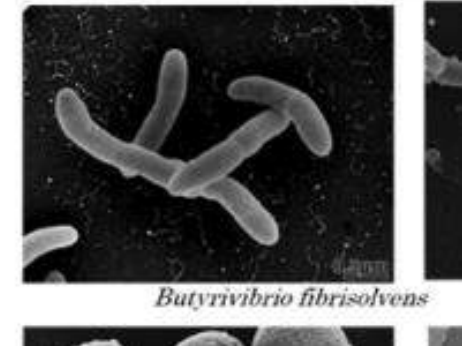
RUMEN



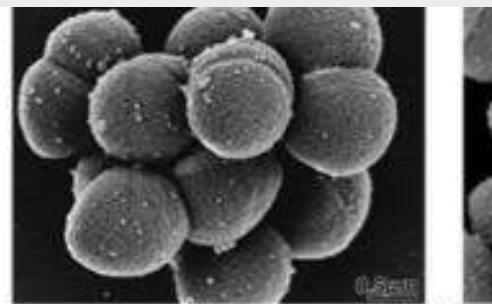
Bacteries



Ruminococcus flavefaciens



Butyrivibrio fibrisolvens

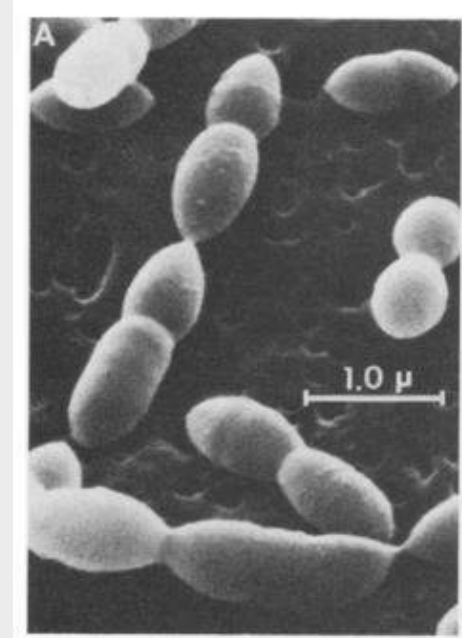


Megasphaera elsdenii



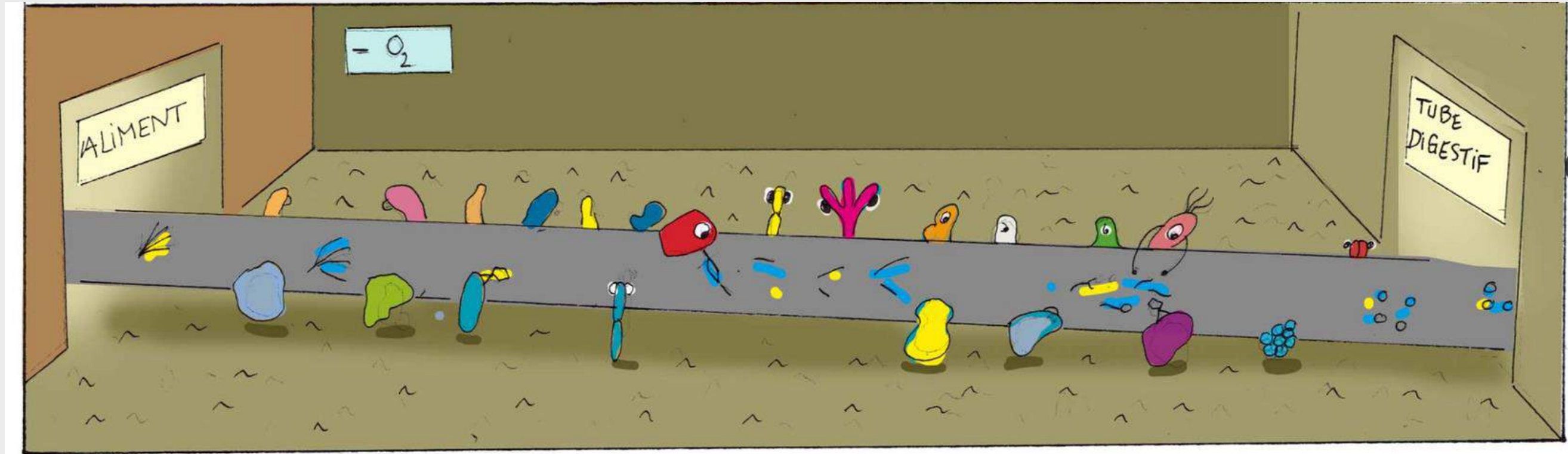
Selenomonas ruminantium

Archées

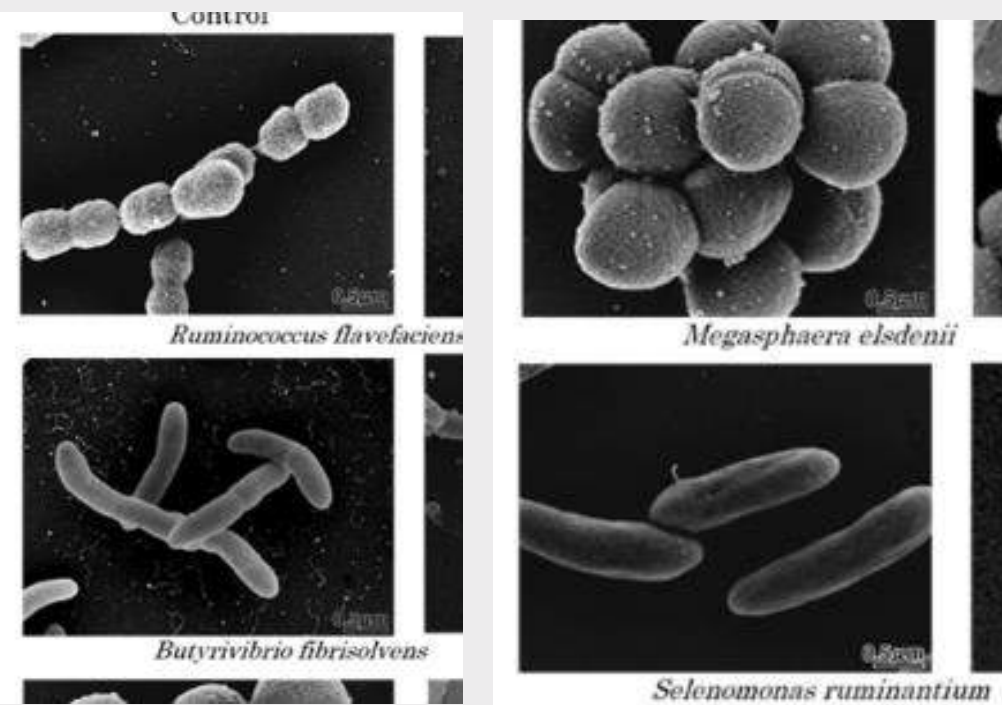


M. ruminantium

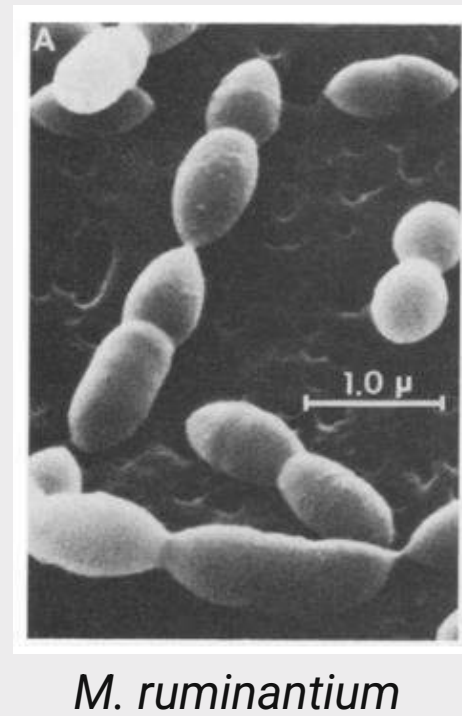
RUMEN



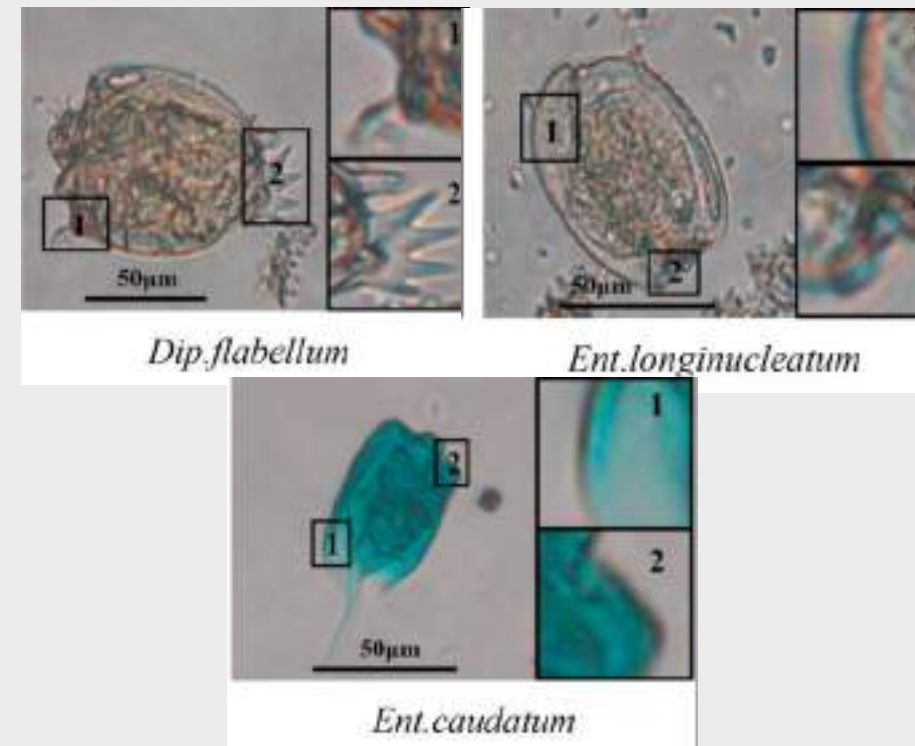
Bacteries



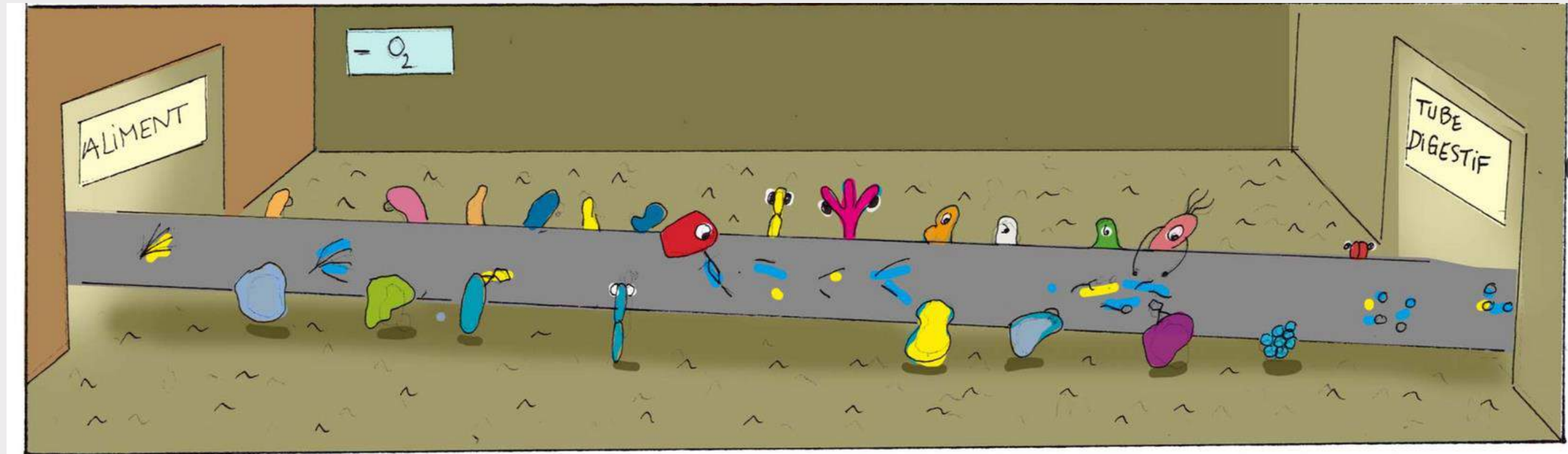
Archées



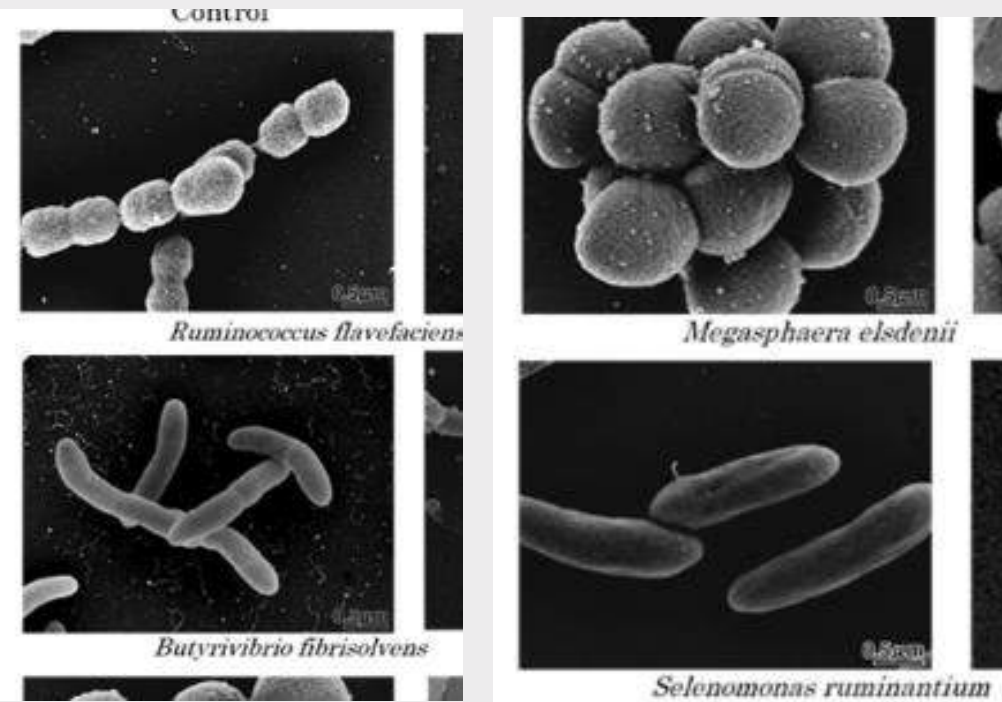
Protozoaires



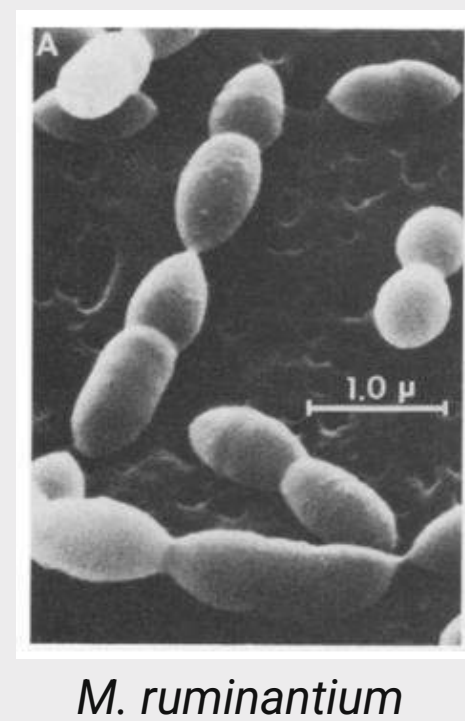
RUMEN



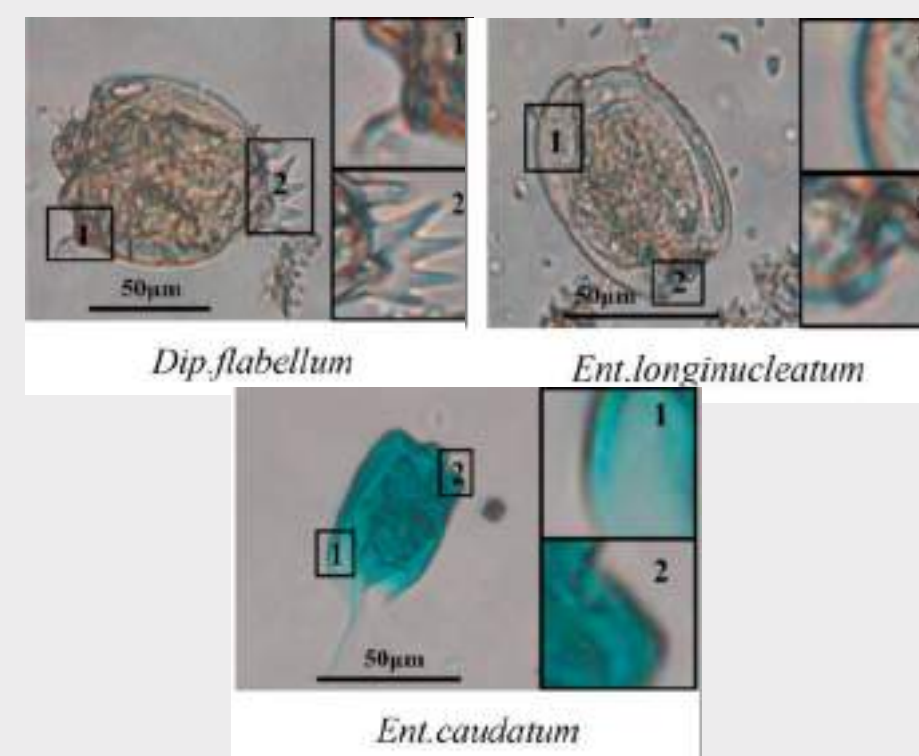
Bacteries



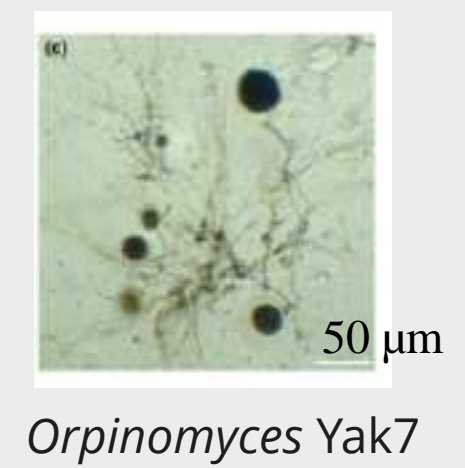
Archées



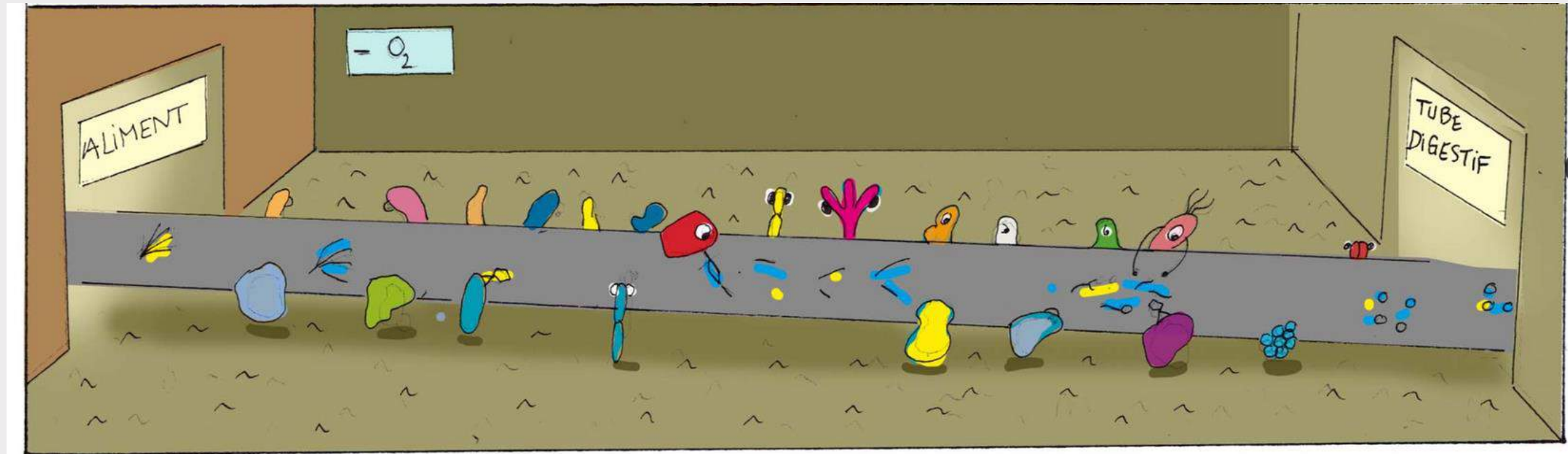
Protozoaires



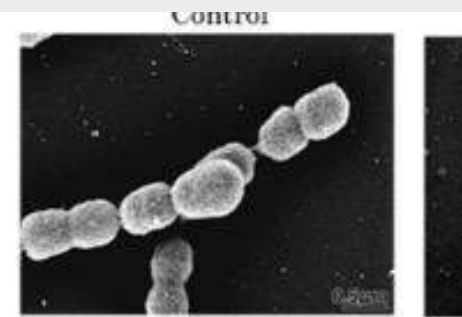
Champignons



RUMEN



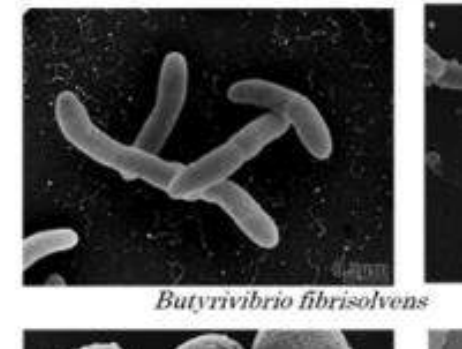
Bacteries



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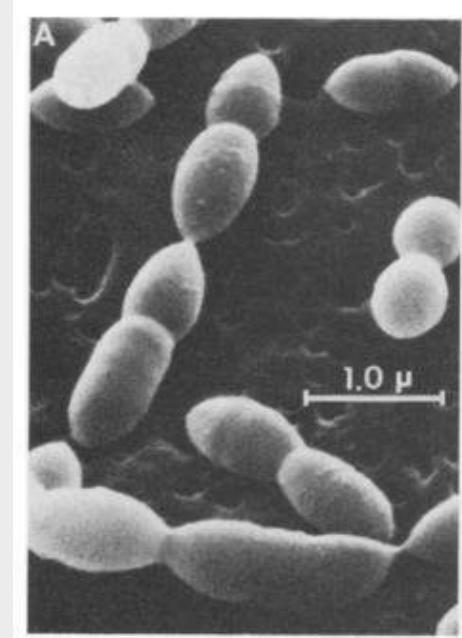


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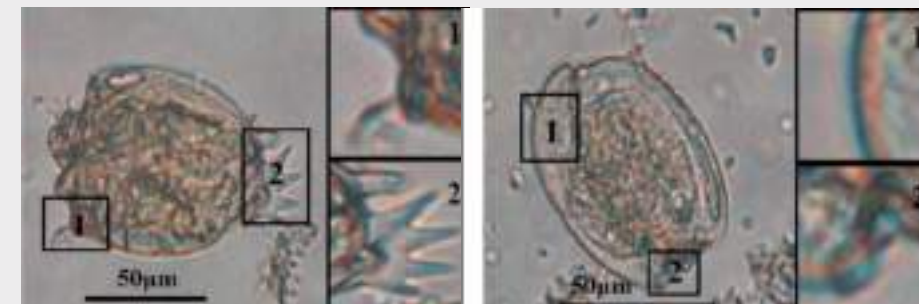
Selenomonas ruminantium

Archées



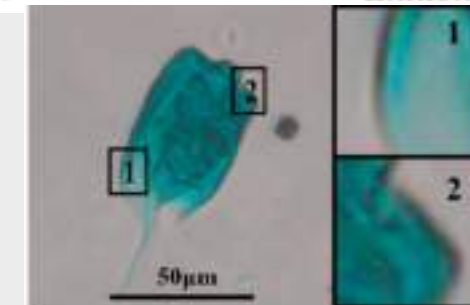
M. ruminantium

Protozoaires



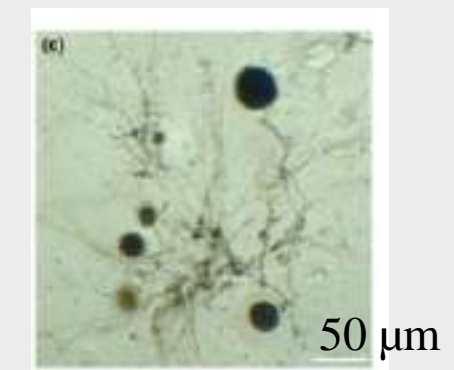
Dip. flabellum

Ent. longinucleatum



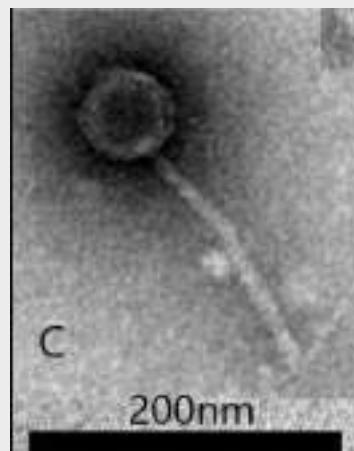
Ent. caudatum

Champignons



Orpinomyces Yak7

Virus



Siphoviridae

RUMEN

10^{10} – 10^{11}
/mL

40-90% de la
biomasse
microbienne



Bactéries

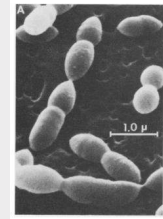
- Digère la cellulose
- Digère l'hémicellulose
- Digère l'amidon
- Digère les protéines
- Utilisation des sucres
- Utilisation d'acides ...

RUMEN

- Production Méthane

10^6 to 10^8 /mL

2% and 4% de la biomasse microbienne



Archées

40-90% de la biomasse microbienne

10^{10} - 10^{11} /mL



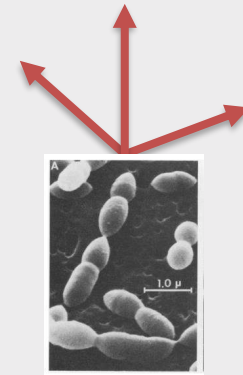
Bactéries

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RUMEN

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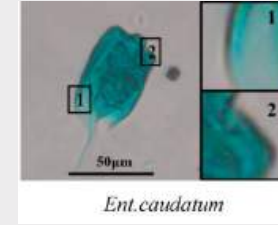
10^6 to 10^8 /mL



Archées

2% and 4% de la biomasse microbienne

Protozoaires



Ent. caudatum

10^5 – 10^6 / mL

0- 60 % de la biomasse microbienne

- Hydrolyse structure polysaccharide (Entodinuim)
- Utilise les sucres solubles
- prédateur pour les bactéries

10^{10} – 10^{11} /mL

40-90% de la biomasse microbienne



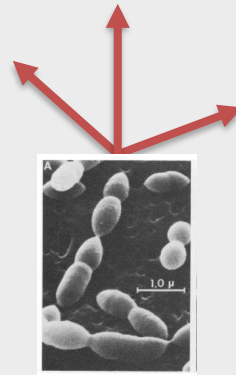
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RUMEN

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Archées

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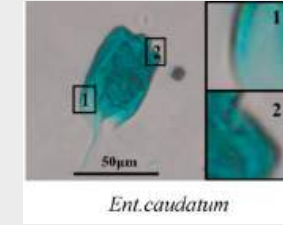
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Protozoaires



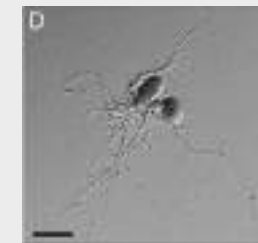
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Champignons



10^3 - 10^6 zoospores/ml

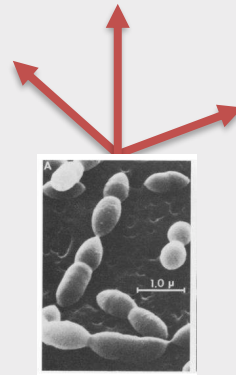
8-12% de la biomasse microbienne

- Sécrètent de grandes quantités d'enzymes cellulolytiques
- hyphes peuvent détruire la structure de la paroi cellulaire des aliments

RUMEN

• Production Méthane

10^6 to 10^8 /mL



Archées

2% and 4% de la biomasse microbienne

10^{10} - 10^{11} /mL

40-90% de la biomasse microbienne

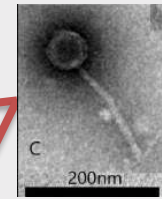


Bactéries

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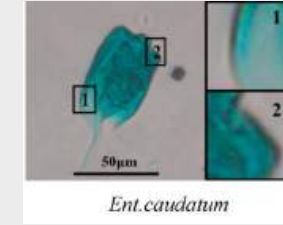
10^7 - 10^{10} particules

Virus



Transfert de gènes / Régulation écosystème

Protozoaires



Ent. caudatum

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Champignons

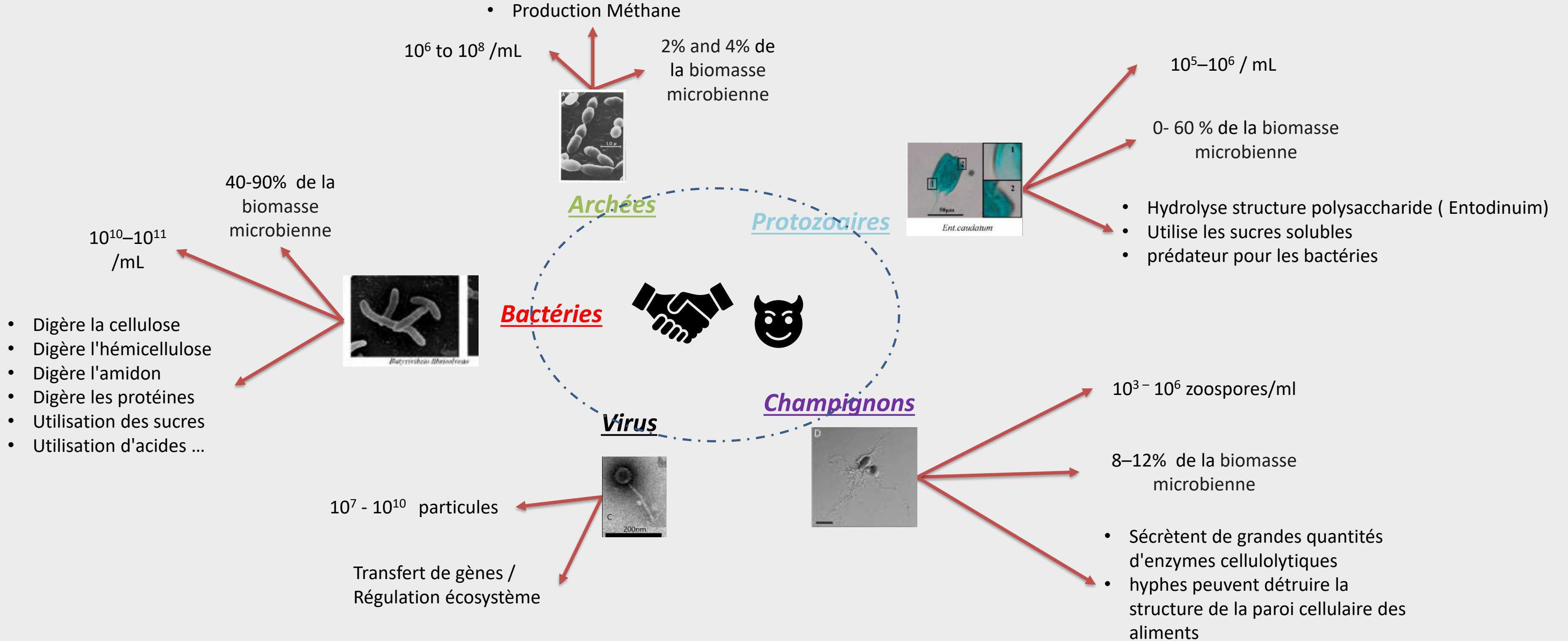


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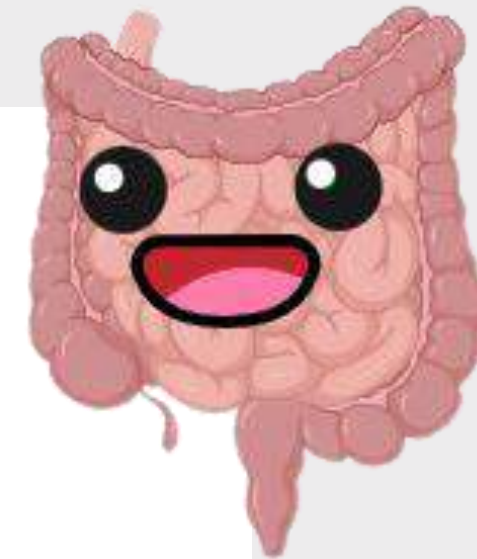
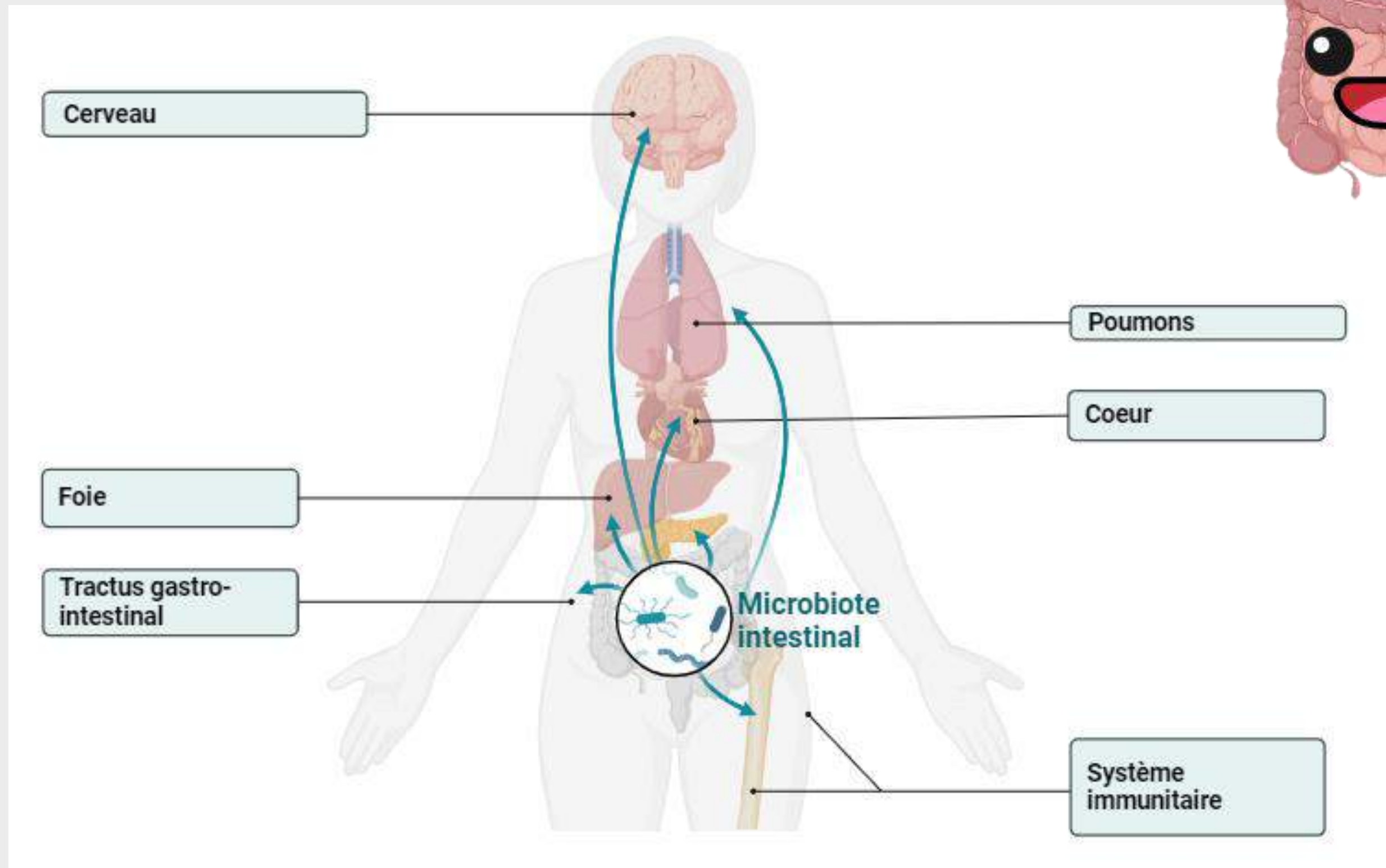
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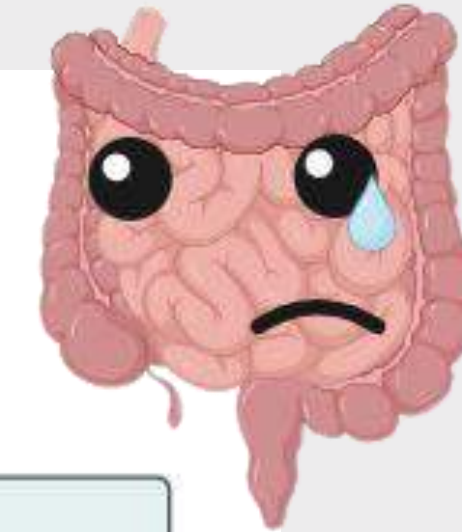
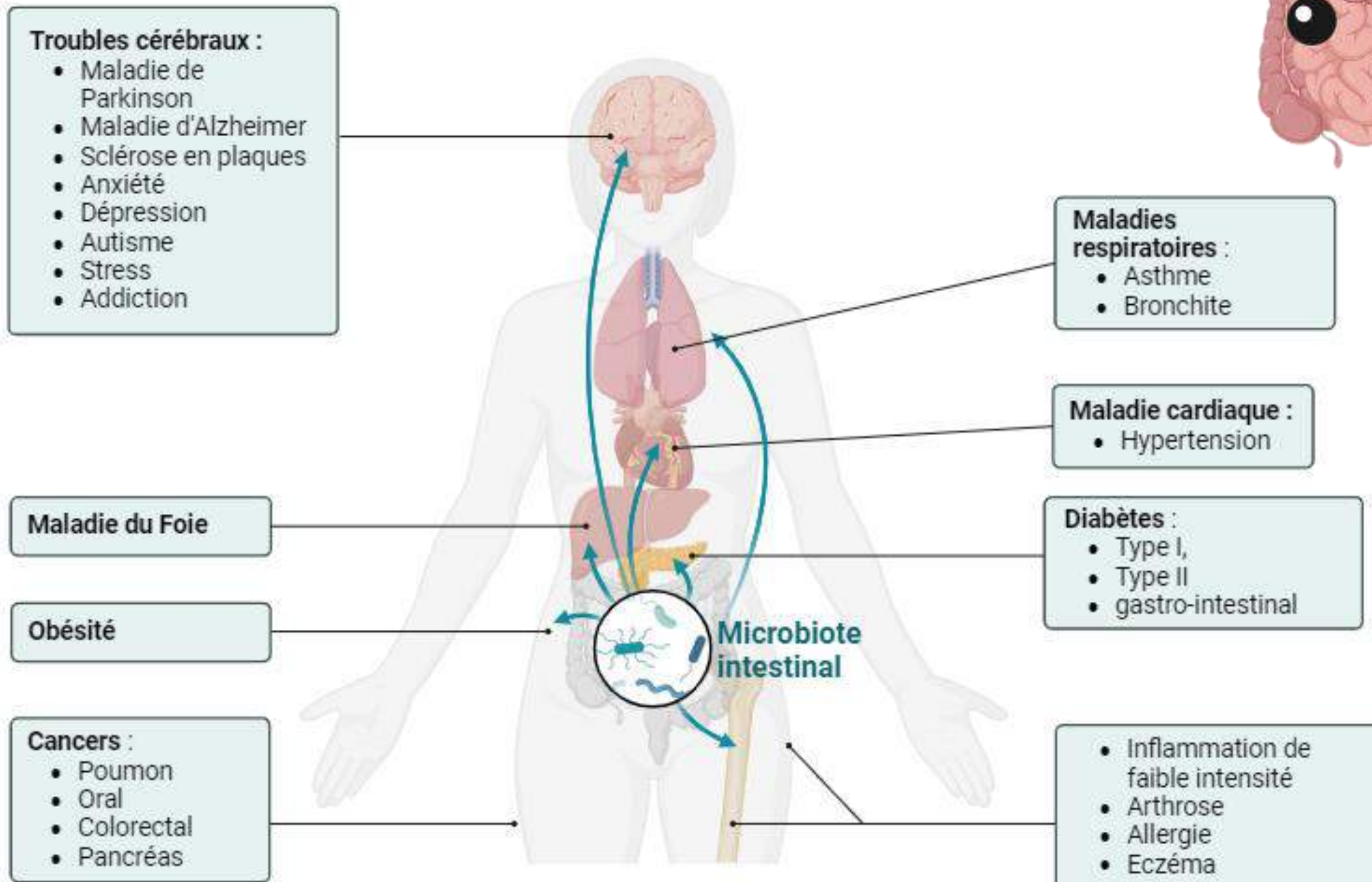
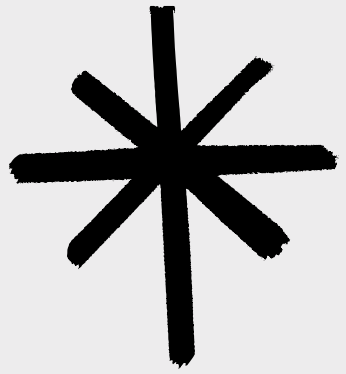
RUMEN



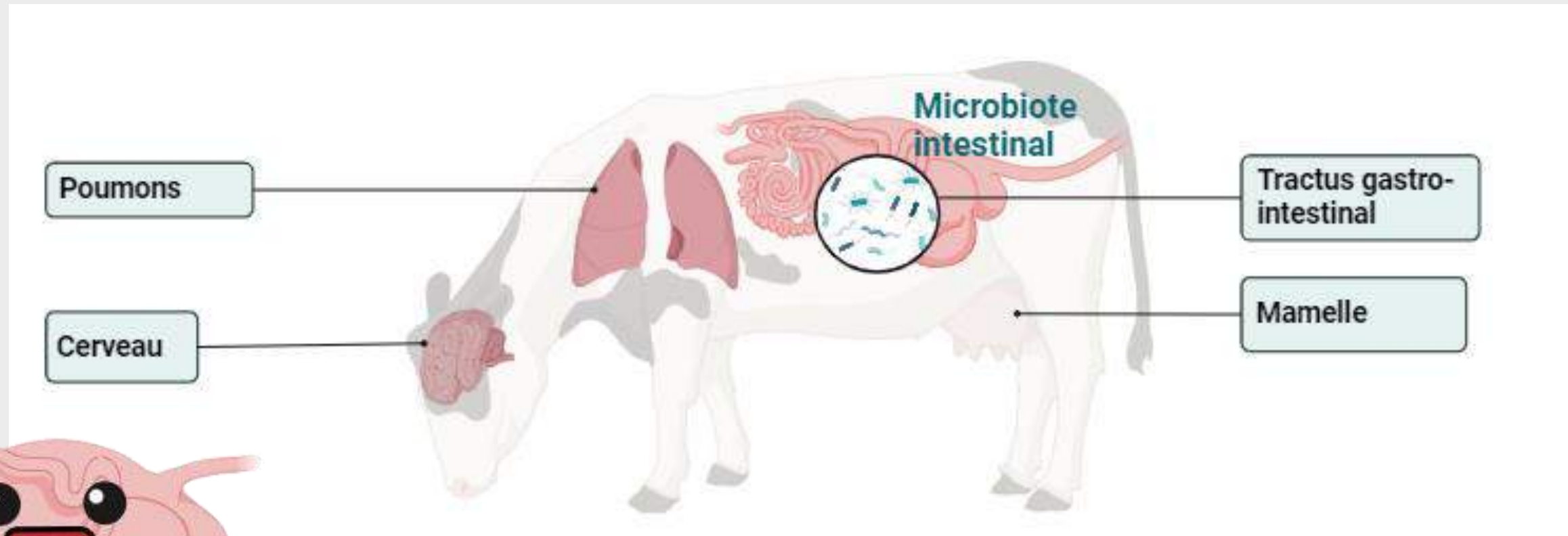
MICROBIOTE EN EQUILIBRE



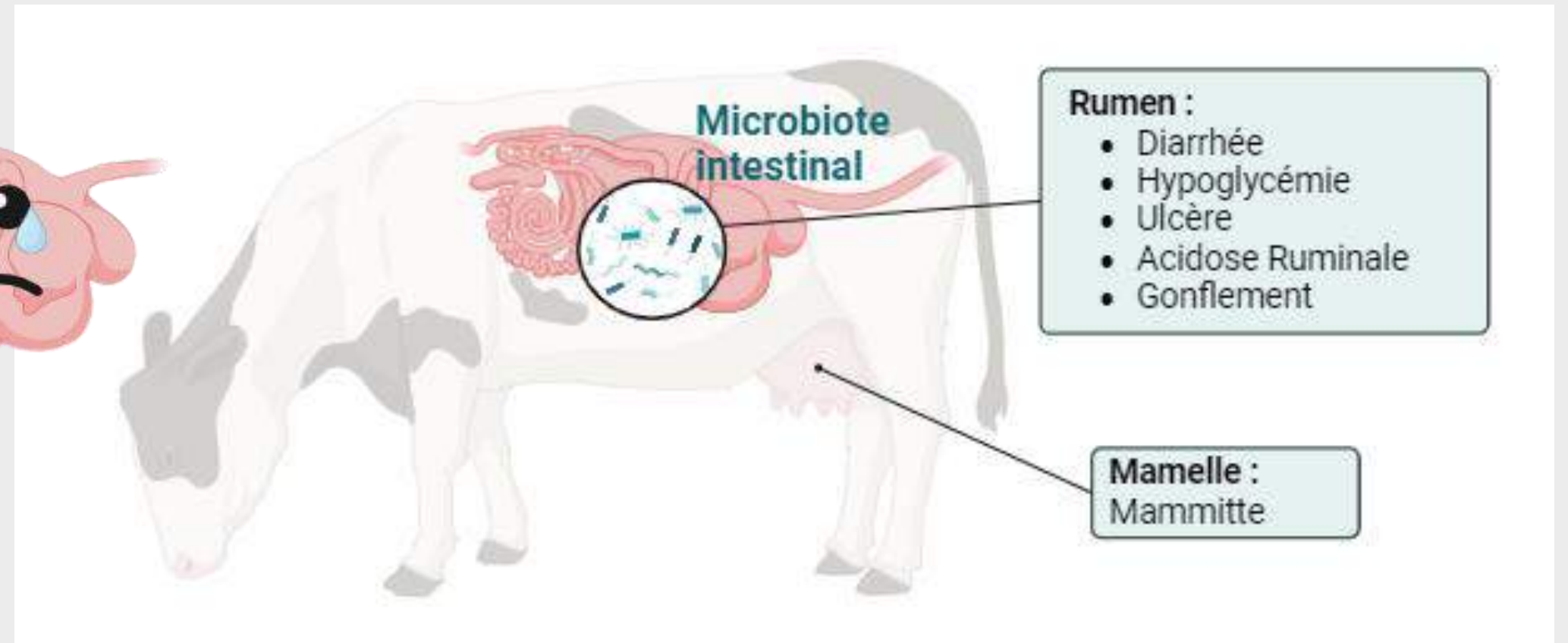
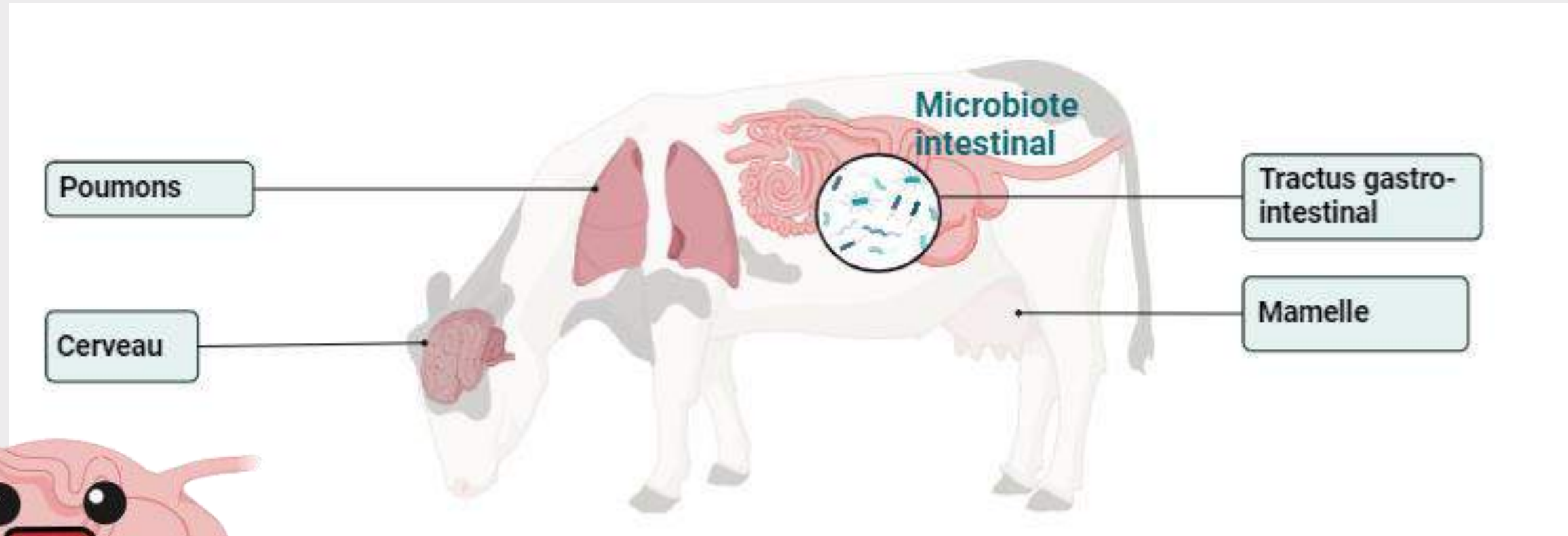
MICROBIOTE EN DESEQUILIBRE

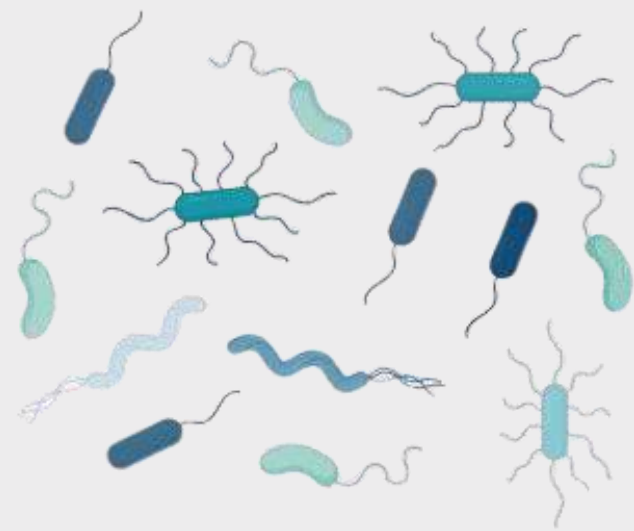


MICROBIOTE RUMINAL

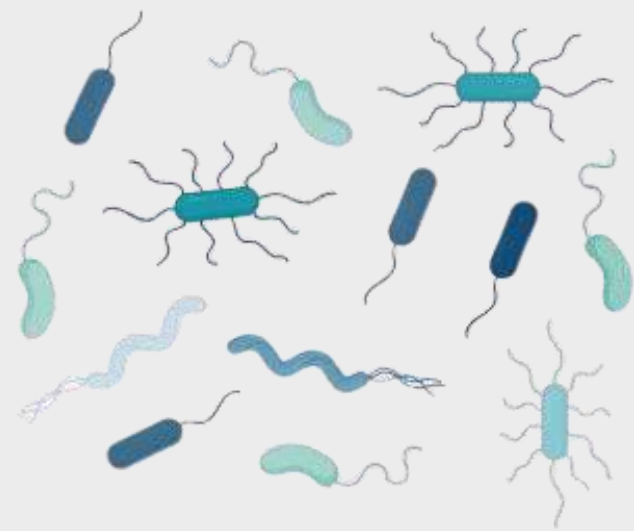
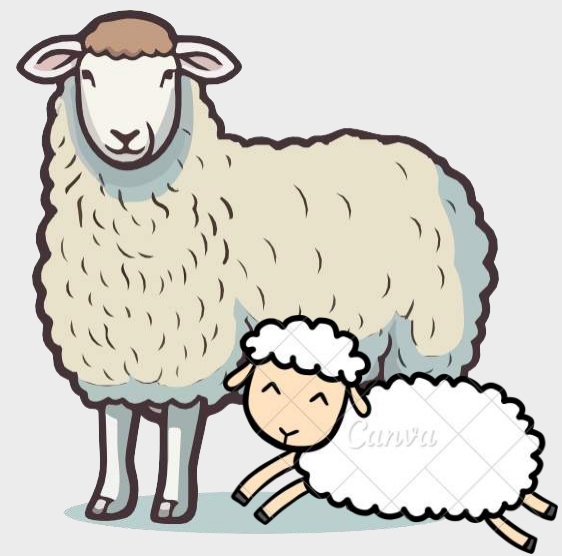


MICROBIOTE RUMINAL





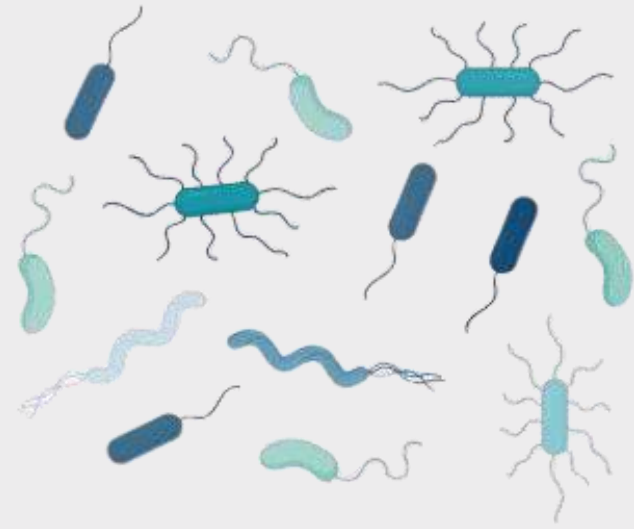
MICROBIOTE DE LOUIS



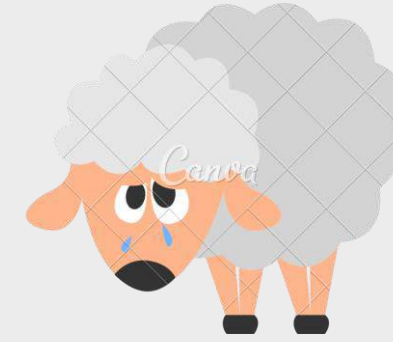
MICROBIOTE DE LOUIS



MICROBIOTE DE SHAUN



MICROBIOTE DE LOUIS



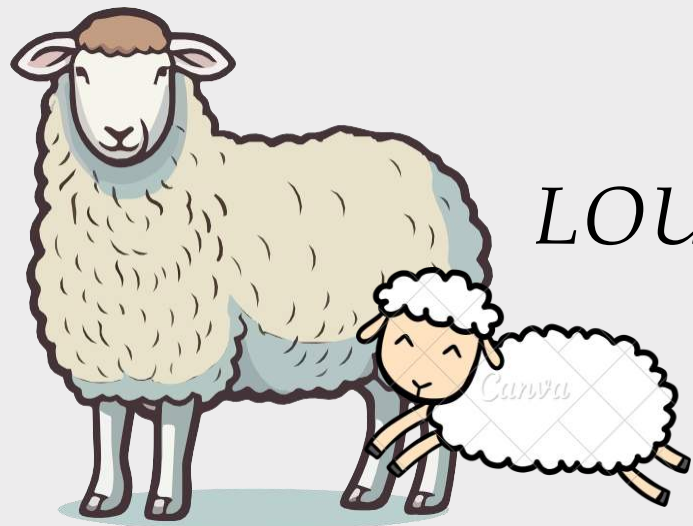
MICROBIOTE DE SHAUN

COMMENT Y REPONDRE ?

SHAUN

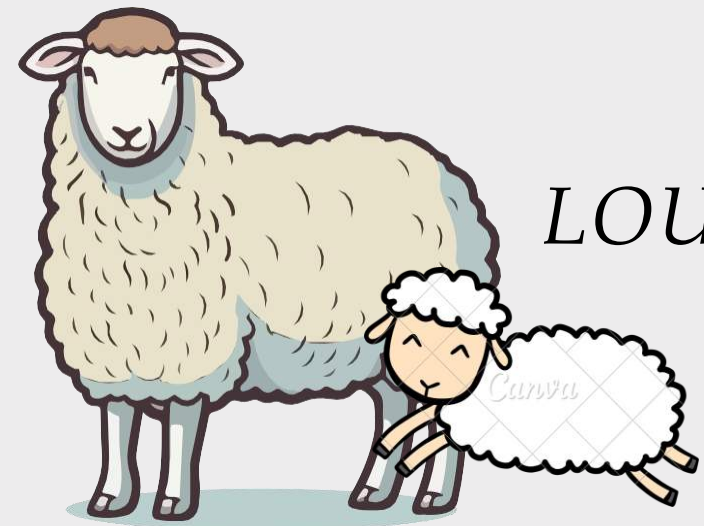
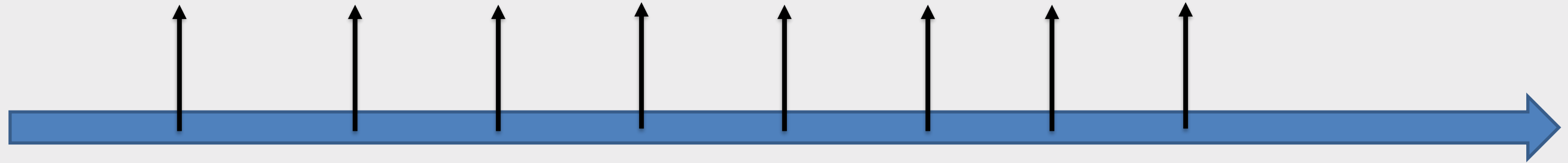
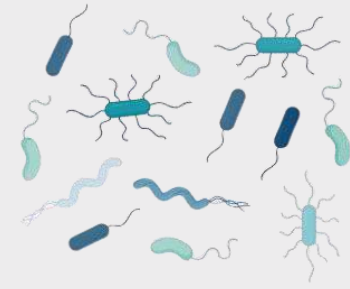


LOUIS



COMMENT Y REPONDRE ?

SHAUN



LOUIS



MICROBIOTE AVANT ET
APRES DIARRHEE !

MERCI DE VOTRE ATTENTION

LAURIANNE VOLAND



INRAE



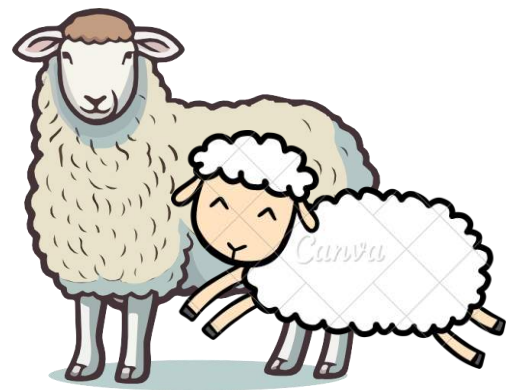
HoloRuminant
Understanding microbiomes of the ruminant holobiont



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UCA
ÉCOLE DOCTORALE
DES SCIENCES DE LA VIE,
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ENVIRONNEMENT

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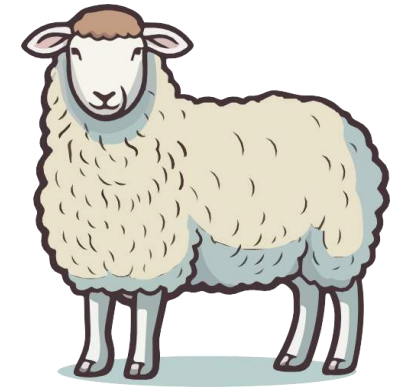


Lait Maternelle

Lait Maternelle



Sevrage



0 1 2 3 4 5 6 7 1 semaine 2 semaines 3 semaines



Bactéries



Champignons



Protozoaires



Archées