

# SHEEP AS AN ANIMAL MODEL TO PROMOTE THE APENNINE TERRITORY DEVELOPMENT VIA DERIVED PRODUCTS: THE CASE STUDY OF ADIPOKINES



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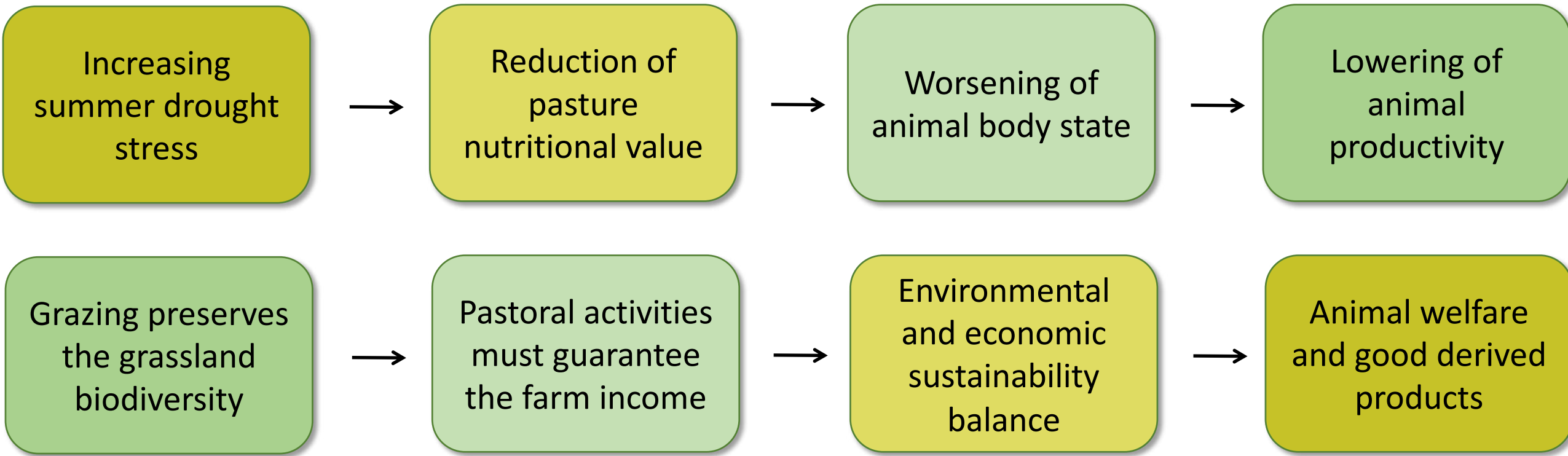
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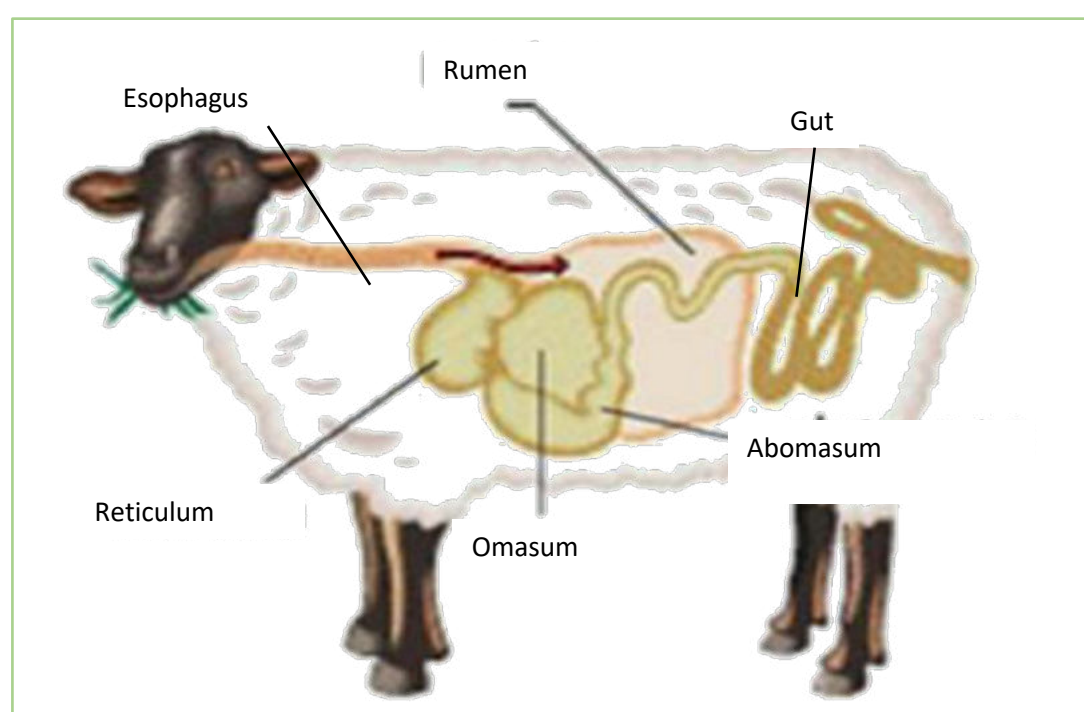
## State of the Art

The growing summer drought stress due to global warming is pre-empting the moment of maximum flowering of pasture and shortening the availability period of fresh forage with an adequate nutritional value to ensure animal welfare, which influences animal productivity. An animal with a good state of health produces in a better way [1].



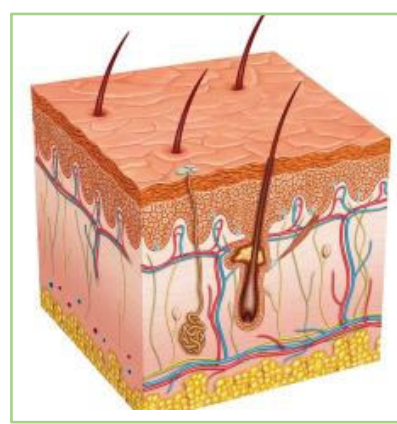
## Research Project Main Topic

The first aim of the research project is the study of adipokines, especially apelin and leptin, as possible markers of animal welfare through their evaluation in the digestive and integumentary apparatus of sheep raised in a semi-extensive way concerning different diets.



### Adipokine's roles in Digestive apparatus

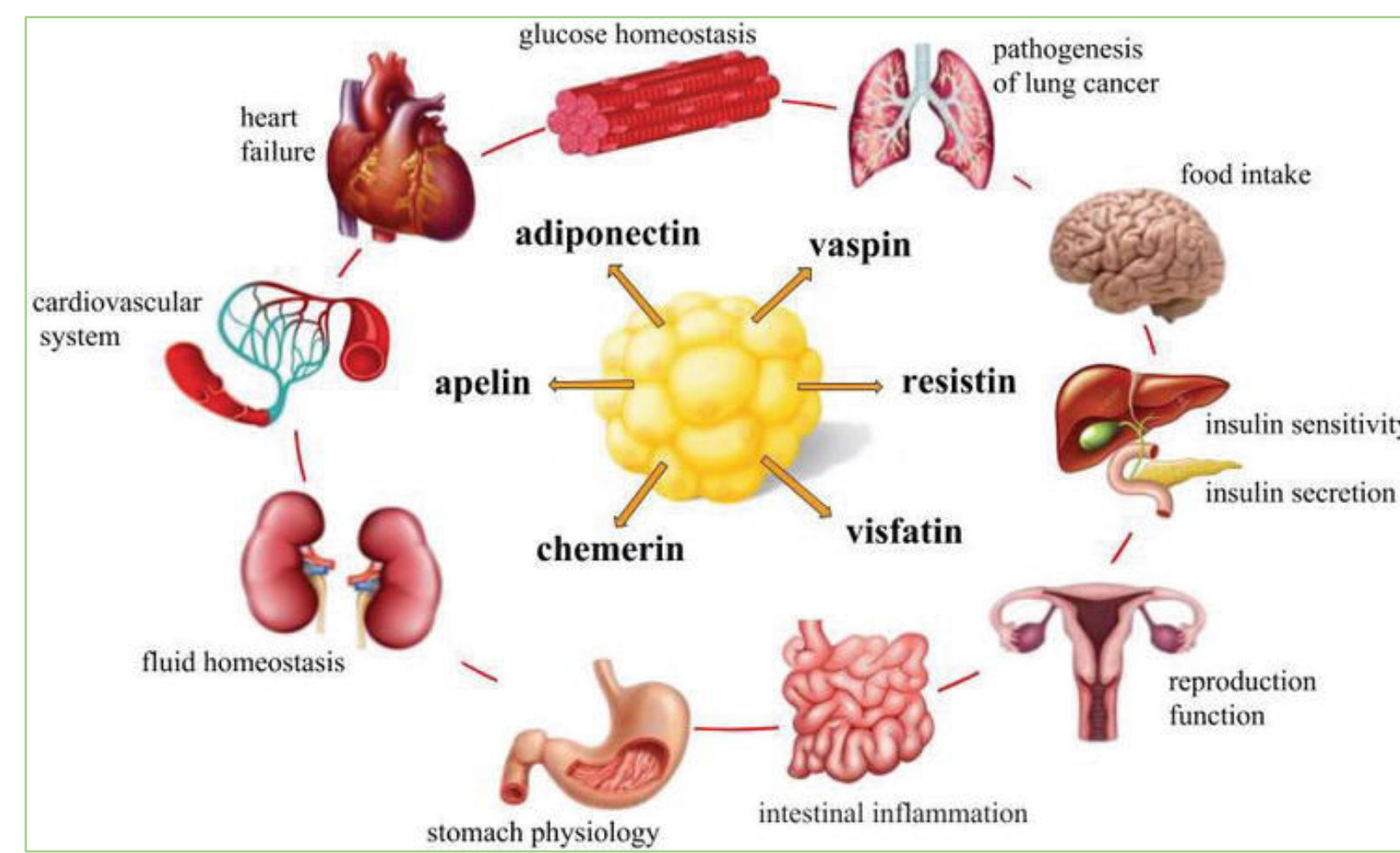
- ✓ Orexigenic or anorexigenic action
- ✓ Regulation of gastric acid secretion



### Adipokine's roles in Integumentary apparatus

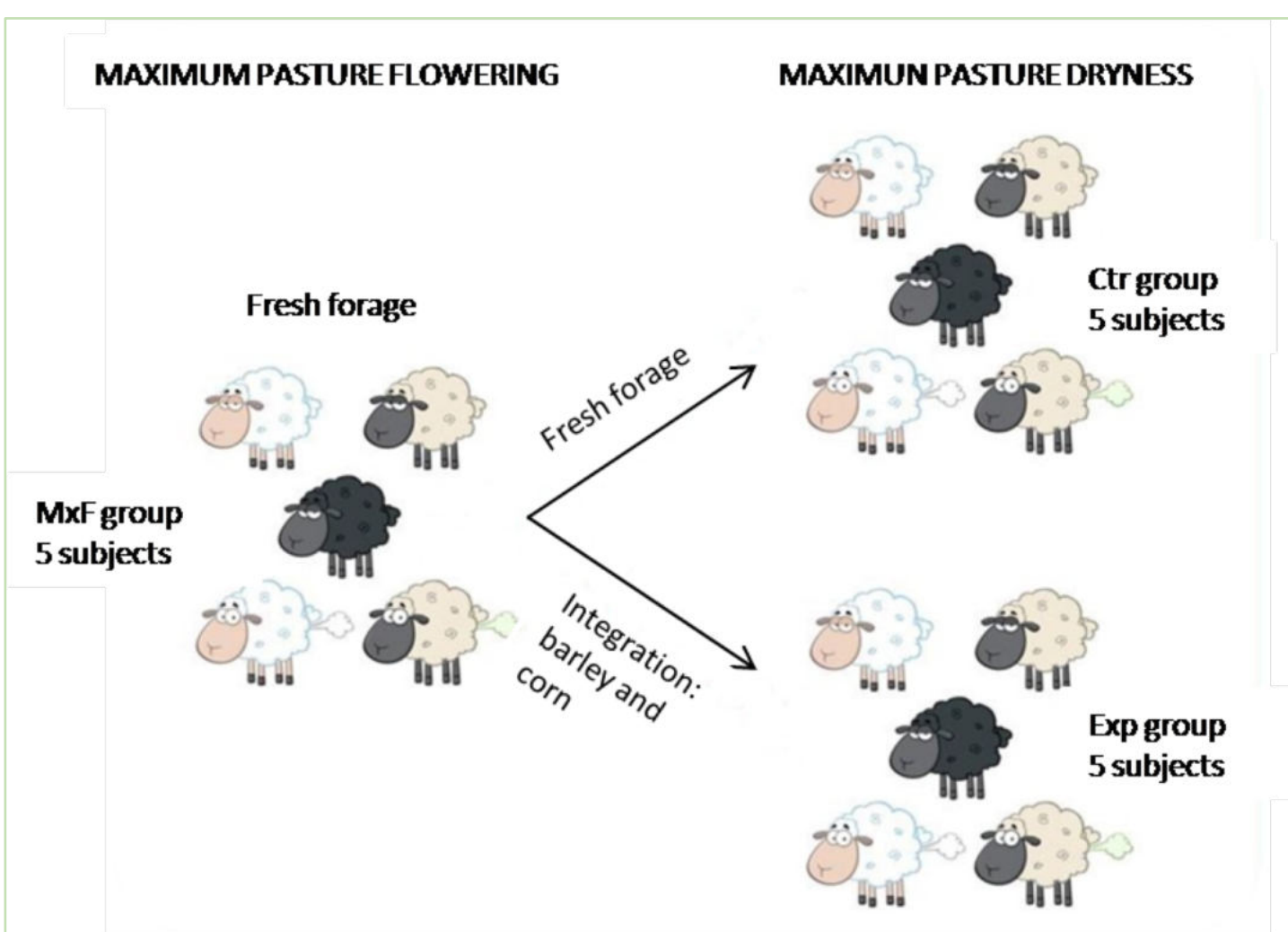
- ✓ Proliferation of keratinocytes and dermal cells
- ✓ Support of skin regenerative activity

Adipokines are biologically active molecules with hormonal action, produced mainly by white adipose tissue related to the individual's nutritional status, that act in an autocrine, paracrine and endocrine fashion. They have been detected in several organs and tissues where they contribute to the regulation of numerous metabolic processes [2,3].



The white adipose tissue is no longer considered an inert tissue but a real endocrine organ able to perform a wide range of functions through the production of adipokines [4].

## First Research Study



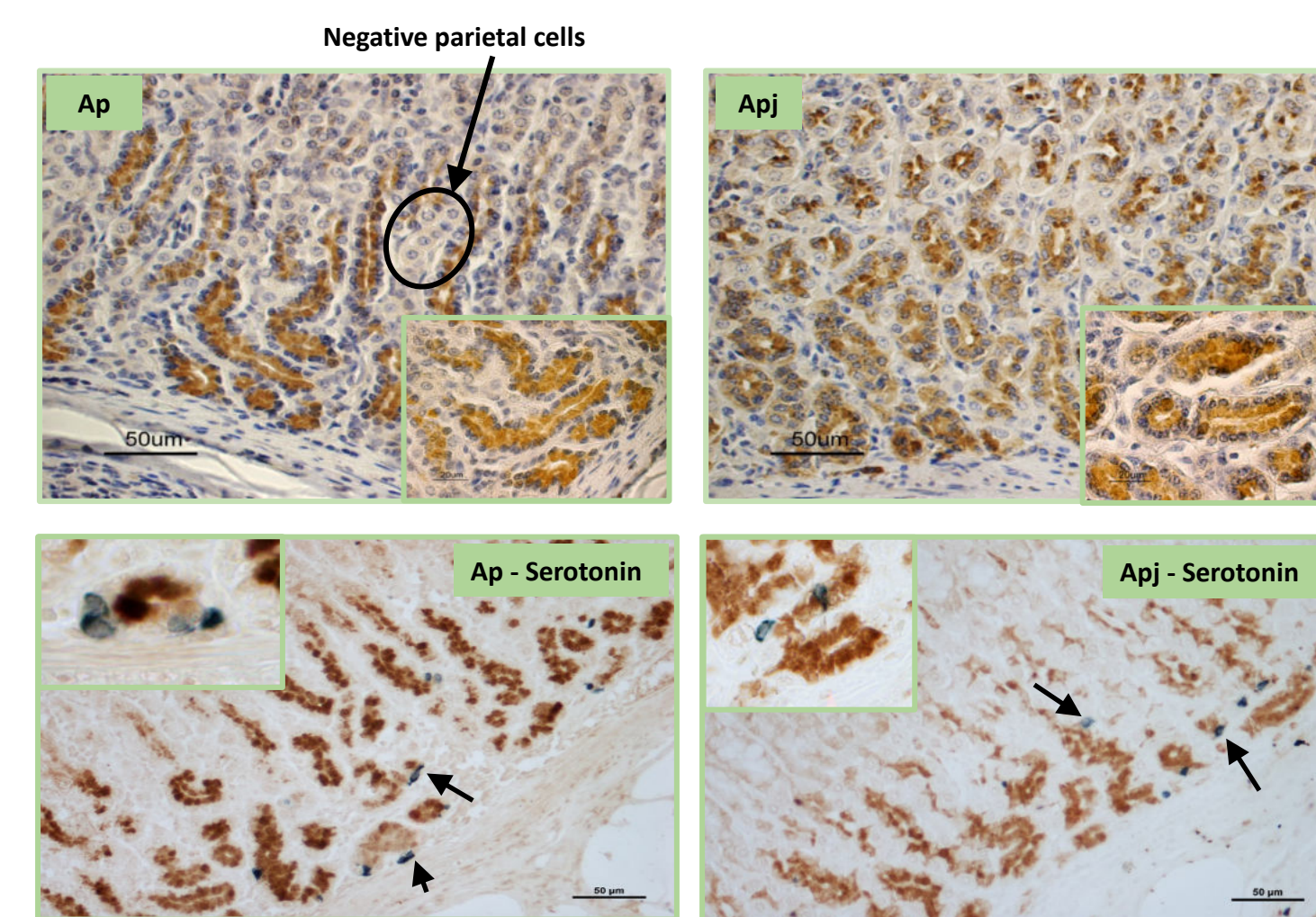
Immunohistochemical (IHC) investigation on the Apelin (Ap) and its receptor (Apj) in the abomasum of three groups of adult female sheep subjected to different diets. For the IHC reaction, sections were incubated overnight at room temperature with:

- ✓ 1:200 rabbit polyclonal anti-Ap antibody (Novus Biological)
- ✓ 1:400 rabbit polyclonal anti-Apj antibody (Abnova).

A double-label localization of Ap and Apj with serotonin has been performed incubating sections overnight with 1:50 mouse anti-serotonin antibody (Dako).

It has been observed the Ap and Apj presence in all analyzed samples; the positive cells have been found in the mucous layer, especially in the basal region of gastric glands. Double-label IHC showed that serotonin-positive cells did not stain with Ap and Apj.

MxF Group	+++
Exp Group	+++
Ctr Group	+



The comparisons among the three groups evidenced a different intensity of immunopositivity of the three group samples for both Ap and Apj.

Results led us to suppose a possible influence of diet on the amount of molecule secreted by the organ and the likely role of Apelinergetic system in regulating digestive function.

## Ethical Aspects

### The ethics of communication in the project

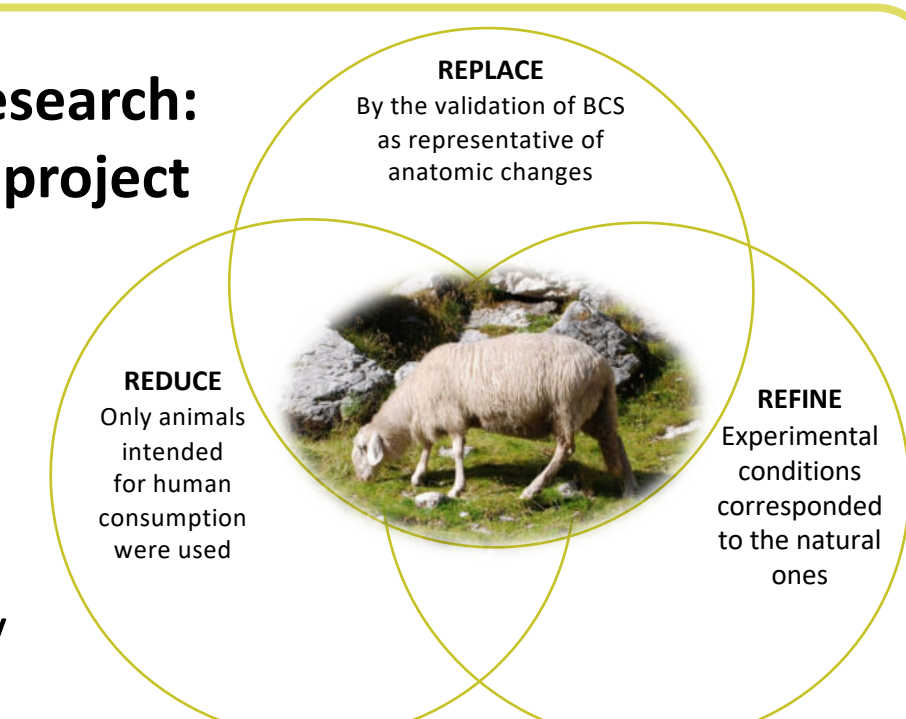
The consumer's perception towards the role of animal welfare on the productive performances will be evaluated:

- ✓ sensitizing the consumers about conscious consumption, animal welfare and its influence on the organoleptic properties of derived food products;
- ✓ carrying out workshops in the primary school about the biodiversity conservation, information on the adipokines and their role in energy metabolism.



### The ethics of scientific research: the 3R concept [5] in the project

Evaluation will be performed by questionnaires administration



## References

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- [2] Susaki E. et al. Apelin cells in the rat stomach. *Regul Pept* 129(1-3):37-41, 2005.
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- [5] Russell W.M.S. and Burch R.L. *The principles of humane experimental technique*. 1959; London.

