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**THE ROLE OF PROTEIN-MINERAL-VITAMIN NUTRITION IN ENSURING REPRODUCTIVE
FUNCTION IN SHEEP**

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Abstract:

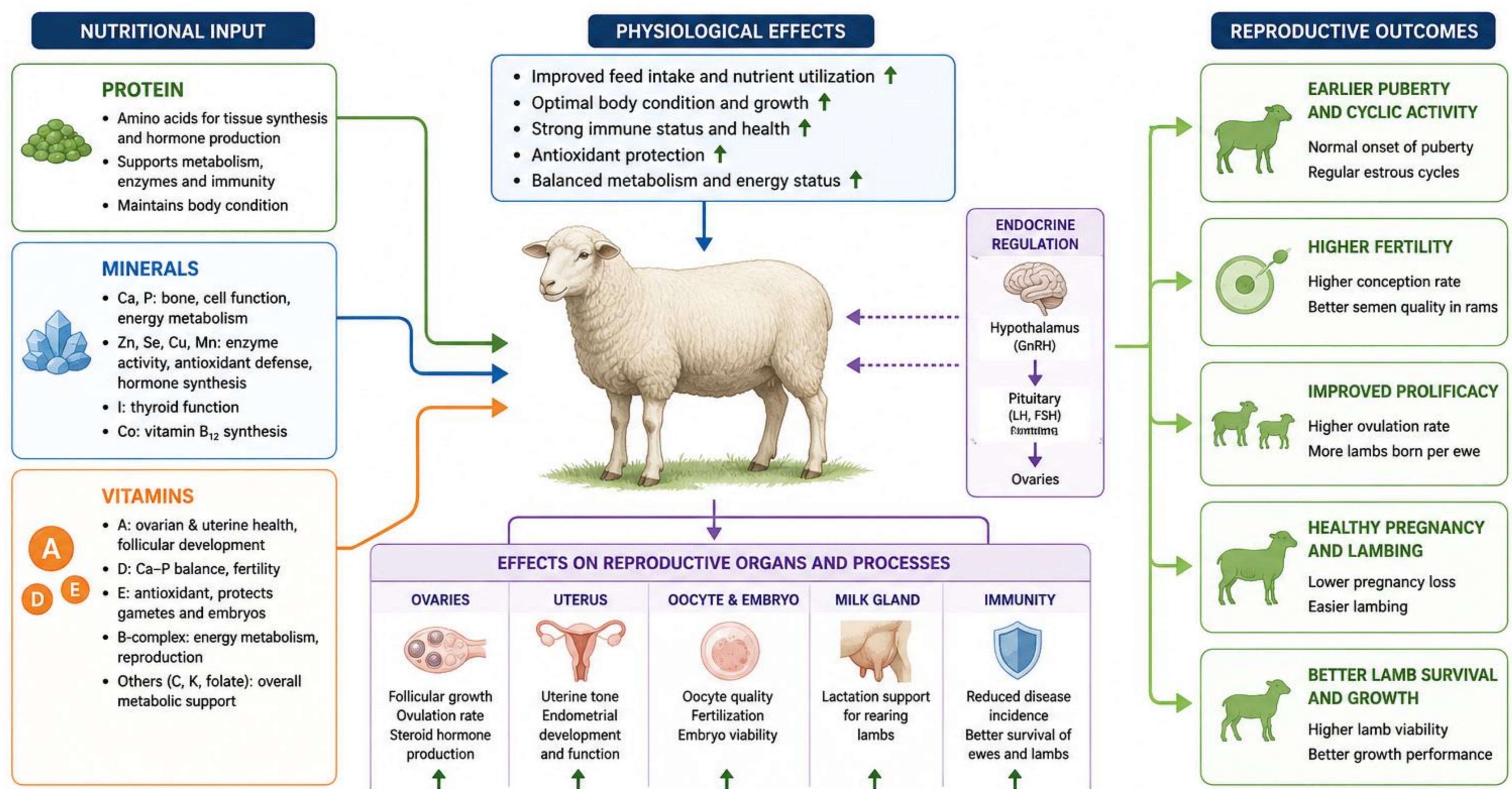
The synergistic effects of protein, mineral and vitamin nutrition in sheep strongly influence reproductive efficiency, as they are directly involved in the regulation of endocrine activity, metabolic balance and reproductive physiology. The paper aims to synthesize current knowledge about the integrated role of these nutritional components in supporting reproductive function, influencing processes such as follicular development, ovulation, conception, embryo survival and fetal growth.

Protein nutrition provides the essential amino acids necessary for hormone synthesis, tissue development and enzymatic activity. Ensuring an adequate protein intake supports optimal ovarian function, while imbalances - especially excess rumen-degradable protein - can increase blood urea nitrogen levels, causing a negative effect on the uterine environment and embryo viability. Energy-protein interactions are considered critical, as the efficient use of dietary protein depends on an adequate energy intake.

The minerals selenium, zinc, copper, iodine and manganese play an essential role in reproductive physiology through their involvement in hormone synthesis, antioxidant defense systems, immune function and cellular metabolism. Zinc is an essential mineral for gonadal development and steroidogenesis, while iodine is essential for the production of thyroid hormones and the regulation of metabolic activity. Selenium and vitamin E act synergistically to protect reproductive tissues from oxidative stress, thus improving fertility and reducing embryonic losses.

Vitamins A, D and E are the most important vitamins responsible for maintaining reproductive health. Vitamin A is involved in epithelial integrity and embryonic development, vitamin D regulates calcium metabolism and ovarian function, and vitamin E acts as a key antioxidant, protecting gametes and embryos from oxidative stress. Deficiencies or imbalances in these micronutrients may result in reproductive disorders, including delayed puberty, anestrus, reduced conception rates and increased embryonic mortality.

In conclusion, protein-mineral-vitamin nutrition plays a major role in regulating the reproductive performance of sheep. Achieving an optimal balance of these nutrients is essential for improving fertility, supporting embryo development and ensuring sustainable sheep production systems.



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