Meat science and Foodomics: application of omics approaches to meat quality management
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Abstract:

The emergence of new biotechnologies, including OMICs, has had a positive impact on all disciplines in the biological and life sciences. During the past two decades, advancements in the field of omic technologies have further contributed to the expansion of our understanding of the molecular bases underpinning the conversion of muscle to meat. The process of muscle to meat conversion corresponds to the onset of so-called apoptosis, which results from progressive metabolic arrest and full consumption of ATP reservoirs. Bleeding of the hung carcass exacerbates this phenomenon, promoting local deoxygenation and scarcity of nutrients in the muscles leading to anoxia. In such conditions, each cell can decide to die by initiating the apoptotic process. After assuming this biological process in died muscle cells, proteomics approaches have provided us with a better understanding of postmortem proteolysis and its relation to meat tenderness. This includes discovery of degradation products from proteins thought to be unaltered during postmortem storage and the involvement for example of heat shock proteins (Hsp). Not surprisingly, proteomics has also been used by several groups to identify potential protein markers or biomarkers for meat quality, especially tenderness. The power of these meat quality biomarkers to explain variation are in progress in our laboratory, some of the first significant results will be presented in this communication giving a better clear picture of this complex process. Developing meat quality biomarkers have the potential both to make possible the classification of meat cuts soon after slaughter on the basis of their potential ultimate tenderness and to be used as surrogate measures in future genetic programs for the optimization of the genetic selection of meat animals on the basis of this quality. Those studied biomarkers by our group, led us to a new classification according to the involved metabolic or biological processes. All of them refer to a series of biological pathways including glycolytic and oxidative energy production, cell detoxification, protease inhibition, production of Heat Shock Proteins, annexins, galectins and peroxiredoxins …etc. The identified relationships among the studied biomarkers using protein-protein networks were done with accurate tools and will be presented in this communication.

Mots clés : Meat quality, muscle conversion, biomarkers, OMICs, networks.