New insights on the role of connexins and gap junctions channels in adipose tissue and obesity

- González-Casanova J.E.[a]
- Durán-Agüero S.[b]
- Caro-Fuentes N.J.[a]
- Gamboa-Arancibia M.E.[c]
- Bruna T.[d]
- Bermúdez V.[e]
- Rojas-Gómez D.M.[f]

Abstract

Due to the inability to curb the excessive increase in the prevalence of obesity and over-weight, it is necessary to comprehend in more detail the factors involved in the pathophysiology and to appreciate more clearly the biochemical and molecular mechanisms of obesity. Thus, understanding the biological regulation of adipose tissue is of fundamental relevance. Connexin, a protein that forms intercellular membrane channels of gap junctions and unopposed hemichannels, plays a key role in adipogenesis and in the maintenance of adipose tissue homeostasis. The expression and function of Connexin 43 (Cx43) during the different stages of the adipogenesis are differentially regulated. Moreover, it has been shown that cell–cell communication decreases dramatically upon differentiation into adipocytes. Furthermore, inhibition of Cx43 degradation or constitutive overexpression of Cx43 blocks adipocyte differentiation. In the first events of adipogenesis, the connexin is highly phosphorylated, which is likely associated with enhanced Gap Junction (GJ) communication. In an intermediate state of adipocyte differentiation, Cx43 phosphorylation decreases, as it is displaced from the membrane and degraded through the proteasome; thus, Cx43 total protein is reduced. Cx is involved in cardiac disease as well as in obesity-related cardiovascular diseases. Different studies suggest that obesity together with a high-fat diet are related to the production of remodeling factors associated with expression and distribution of Cx43 in the atrium.

Author keywords

Adipose tissue; Cardiovascular diseases; Connexins; Gap junctions channels; Obesity