

# Regulation of Connexin-based channels by fatty acids

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In this mini-review, we briefly summarize the current knowledge about the effects of fatty acids (FAs) on connexin-based channels, as well as discuss the limited information about the impact FAs may have on pannexins (Panxs). FAs regulate diverse cellular functions, some of which are explained by changes in the activity of channels constituted by connexins (Cxs) or Panxs, which are known to play critical roles in maintaining the functional integrity of diverse organs and tissues. Cxs are transmembrane proteins that oligomerize into hexamers to form hemichannels (HCs), which in turn can assemble into dodecamers to form gap junction channels (GJCs). While GJCs communicate the cytoplasm of contacting cells, HCs serve as pathways for the exchange of ions and small molecules between the intra and extracellular milieu. Panxs, as well as Cx HCs, form channels at the plasma membrane that enable the interchange of molecules between the intra and extracellular spaces. Both Cx- and Panx-based channels are controlled by several post-translational modifications. However, the mechanism of action of FAs on these channels has not been described in detail. It has been shown however that FAs frequently decrease GJC-mediated cell-cell communication. The opposite effect also has been described for HC or Panx-dependent intercellular communication, where, the acute FA effect can be reversed upon washout. Additionally, changes in GJCs mediated by FAs have been associated with post-translational modifications (e.g., phosphorylation), and seem to be directly related to chemical properties of FAs (e.g., length of carbon chain and/or degree of saturation), but this possible link remains poorly understood. © 2017 Puebla, Retamal, Acuña and Sáez.

Connexon

G-protein coupled receptor

Gap junction channel

Hemichannel

Pannexon

connexin 43

fatty acid

gap junction protein

membrane protein

messenger RNA

pannexin

protein kinase

unclassified drug

fatty acid analysis

human

intracellular signaling

molecular docking

molecular stability

nonhuman

protein domain

protein expression

protein function

protein lipid interaction

protein localization

protein modification

protein synthesis

regulatory mechanism

RNA synthesis

Short Survey

transcription regulation