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Muscle-kidney crosstalk; the role of myokines

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Abstract
Muscle-kidney crosstalk refers to the communication and interaction between skeletal muscle tissue and the kidneys. One important aspect of this crosstalk is the role of myokines. Myokines are a class of bioactive molecules that are released by contracting skeletal muscles. They act as signaling molecules that can mediate communication between muscle tissue and various target organs, including the kidneys. Myokines are involved in regulating various physiological processes and have been shown to have both local and systemic effects.
Keywords: Muscle-kidney crosstalk, Myokines, Irisin, kidney function, physical activity
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Introduction

The communication between skeletal muscle and the kidneys, known as muscle-kidney crosstalk, plays a crucial role in maintaining overall health and homeostasis (1,2). Skeletal muscle is not only responsible for locomotion but also serves as an endocrine organ that secretes various bioactive molecules called myokines. These myokines have been shown to exert beneficial effects on multiple organs, including the kidneys (3,4). Understanding the mechanisms underlying muscle-kidney crosstalk and the role of myokines is essential for developing novel therapeutic strategies for kidney-related disorders (5,6). This review study aims to explore the role of myokines, which are cytokines secreted by skeletal muscle, in mediating this crosstalk.

Search strategy

For this mini-review, I conducted a comprehensive search using various databases: PubMed, Google Scholar, Directory of Open Access Journals (DOAJ), Web of Science, EBSCO, Scopus, and Embase. We utilized different keywords such as muscle-kidney crosstalk, myokines, irisin, kidney function and physical activity.

Muscle-kidney crosstalk

In the context of muscle-kidney crosstalk, myokines play a role in maintaining overall metabolic homeostasis and in modulating kidney function. Some myokines have been found to directly influence renal function and physiology, while others indirectly affect kidney function through systemic effects on metabolism, inflammation, and cardiovascular health (4,7). One example of a myokine that directly affects the kidneys is called irisin. Irisin is released by skeletal muscles during exercise and has been shown to have beneficial effects on kidney function. Studies have suggested that irisin can protect against kidney injury, reduce inflammation, and improve renal function (8,9).

Other myokines, such as interleukin-6 (IL-6) and brain-derived neurotrophic factor (BDNF), have been shown to have systemic effects that can indirectly influence kidney health. For example, IL-6 can promote inflammation and oxidative stress, which can negatively impact kidney function. On the other hand, BDNF has been found to have protective effects on the kidneys by reducing inflammation and promoting tissue repair (8,10).

The precise mechanisms through which myokines exert their effects on the kidneys are still being researched, and more studies are needed to fully understand the complex muscle-kidney crosstalk. However, the emerging evidence suggests that myokines play an important role in maintaining overall health and may have therapeutic potential for preventing or treating kidney diseases (11,12).

Promoting regular physical activity and exercise is one way to enhance the release of beneficial myokines and support muscle-kidney crosstalk. Additionally, interventions that target specific myokines or their signaling pathways could potentially be developed as therapeutic strategies for kidney diseases. However, more research is needed to fully understand the therapeutic potential of myokines in the context of muscle-kidney crosstalk (13,14).

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Implication for health policy/practice/research/ medical education

Muscle-kidney crosstalk involves the communication and interaction between muscle tissue and the kidneys, mediated by the release of myokines. These bioactive molecules can have direct and indirect effects on kidney function and play a role in maintaining overall health. Further research is needed to fully comprehend the therapeutic potential of myokines in the context of muscle-kidney crosstalk.

Muscle-kidney crosstalk refers to the communication and interaction between skeletal muscle tissue and the kidneys. It involves the release and signaling of bioactive molecules called myokines, which are released by contracting skeletal. Myokines are a class of signaling molecules that act as messengers between muscle tissue and target organs, such as the kidneys. They are released into the bloodstream during muscle contraction and can have both local and systemic effects (12,15).

In terms of local effects, some myokines have been found to directly influence renal function and physiology. For example, the myokine irisin has been shown to have protective effects on the kidneys. Irisin is released by muscles during exercise and has been found to reduce inflammation, protect against kidney injury, and improve renal function (7,16).

In addition to direct effects, myokines can also indirectly affect kidney function through systemic effects on metabolism, inflammation, and cardiovascular health. For instance, IL-6 is a myokine that promotes inflammation and oxidative stress, which can negatively affect kidney function. On the other hand, BDNF has been found to have protective effects on the kidneys by reducing inflammation and promoting tissue repair (4,17).

The precise mechanisms through which myokines exert their effects on the kidneys are still being researched. However, it is believed that they can modulate various signaling pathways involved in maintaining overall metabolic homeostasis and regulating kidney function (9,18).

Conclusion

Given the potential therapeutic implications, more research is needed to fully understand the intricate muscle-kidney crosstalk. Promoting regular physical activity and exercise is one way to enhance the release of beneficial myokines and support muscle-kidney crosstalk. Additionally, interventions that target specific myokines or their signaling pathways could potentially be developed as therapeutic strategies for kidney diseases.

Conflicts of interest

The author declares that he has no competing interests.

Ethical issues

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