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# Mirroring the heart-kidney relationship using organoids FREE

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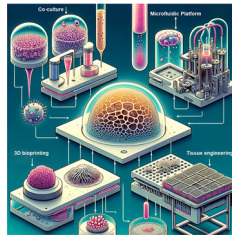


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## Mirroring the heart-kidney relationship using organoids

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**Improved organoid models can more accurately replicate the relationships between organs and reveal novel therapeutic targets.**



Organoids are miniature versions of organs derived from stem cells or tissue-specific progenitors. They reflect the 3D architectures and functions of organs, allowing researchers to examine the complex interactions of cells.

Traditionally, organoids are studied individually. While this has already pushed the frontier in biomedical science in unprecedented ways, inter-organ relations remain relatively unexplored. The heart and kidneys, for example, are organs with a bi-directional relationship essential for maintaining body homeostasis. The decreased function of either organ almost always negatively impacts the other, a condition coined as the “cardiorenal syndrome.”

With a focus on cardiorenal syndromes, Song et al. highlighted the imperative need to study the intricate relationships between organs using interconnected organoids.

“We believe this work paves the way for advanced models in studying multi-organ diseases, providing a solid foundation for the development of targeted therapies,” said author Sun-Woong Kang. “It represents a significant step forward in organoid research, with broad implications for understanding human physiology and disease.”

The authors recommend several important organoid technologies and processes. Advanced co-culture methodologies accurately replicate signaling mechanisms between organs, while 3D bioprinting constructs tissues with extreme specificity. Technologies such as microfluidic platforms, coupled with software algorithms and machine learning, further enable researchers to simulate pathological responses and offer predictive insights.

The authors are confident that inter-organoid research will bring many benefits, providing ethical alternatives and revealing novel therapeutic targets,

“Moving forward, we aim to investigate specific pathological conditions using our organoid model, focusing on identifying potential therapeutic targets,” said Kang. “We also hope our work inspires further research into other interconnected organ systems.”

**Source:** “Revolutionizing biomedical research: The imperative need for heart-kidney-connected organoids,” by Sun-Sook Song, Hun-Jun Park, Yong Kyun Kim, and Sun-Woong Kang, *APL Bioengineering* (2024). The article can be accessed at <https://doi.org/10.1063/5.0190840>.

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