

Researchers make strides toward creating tissue-engineered kidneys

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With a worldwide shortage of kidneys for patients who need kidney transplants, researchers are diligently working to find ways to engineer new kidney tissue from a patient's own cells or another source. They've come a step closer to realizing that goal with a breakthrough described in an upcoming *Journal of the American Society of Nephrology (JASN)* study. The advance could lead to more options for individuals with kidney failure, as well as better tools for understanding kidney diseases and how to treat them.

Investigators can produce tissues similar to immature kidneys from simple suspensions of [embryonic kidney](#) cells, but they have been unsuccessful at growing more mature kidney tissues in the lab because the kidneys' complicated filtering units do not form without the support of blood vessels.

Now, from suspensions of single [kidney cells](#), Christodoulos Xinaris PhD (Mario Negri Institute for Pharmacological Research) and his colleagues have for the first time constructed "organoids" that can be integrated into a living animal and carry out kidney functions including blood filtering and molecule reabsorption. Key to their success was soaking the organoids in a solution containing molecules that promote [blood vessel formation](#), then injecting these molecules into the recipient animals after the organoids were implanted below the kidneys. The organoids continued to mature and were viable for three to four weeks after implantation.

"The ability to build functional renal tissue starting from suspensions of single cells represents a considerable step toward the practical goal of engineering renal tissues suitable for transplantation and offers the methodological basis for a number of investigative and therapeutic applications," said Dr. Xinaris. For example, disease-related genes could be introduced into an organoid to help researchers study the

mechanisms of complex kidney diseases and to perform a preliminary screening of new drugs to treat them.

More information: The article, entitled "In Vivo Maturation of Functional Renal Organoids Formed from Embryonic Cell Suspensions," will appear online on October 18, 2012, [doi: 10.1681/ASN.2012050505](#)

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