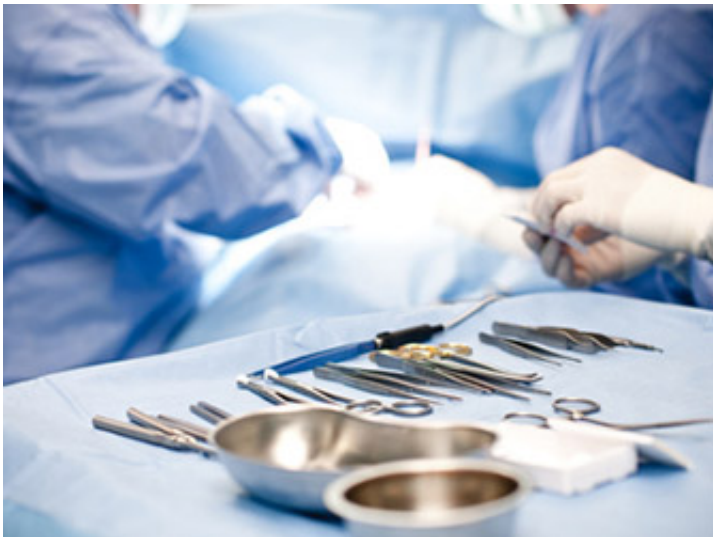


Algorithms resolve kidney crossmatch allocation

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Diseased kidneys can be replaced by a living donation from a healthy person. Often family members or friends volunteer their kidney for transplanting. A prerequisite is that the tissue of the donor and the recipient is immunologically compatible. In approximately one fifth of cases this is not the case. For this reason, highly sensitised people, who have already undergone transplantation, were pregnant or who have received blood, often more than others have to wait many years for a new kidney. Now at the MedUni Vienna a so-called "crossover transplantation" has been successfully carried out at the Vienna General Hospital with the use of innovative computing algorithms. With the

setting up of a systematic crossover programme the waiting time can be significantly reduced.

A few weeks ago a successful crossover transplantation based on a new algorithm was carried out at the Vienna General Hospital in collaboration with the University Department of Surgery at the MedUni Vienna led by Ferdinand Mühlbacher, a team at the University Department of Blood Group Serology and Transfusion Medicine around Gottfried Fischer and the transplantation nephrologist Georg Böhmig of the University Department of Internal Medicine III.

The problem of incompatibility is solved by pairs (married couples, siblings, mother and child, friends, etc.) being selected using a new computing algorithm, which was developed in Australia and evaluated at the MedUni Vienna in a newly published pilot study, in which the organ donation is made possible in a "crossover." This means that each donor, whose kidney is not suitable for their own intended recipient, donates the organ to a stranger, the recipient in another pair and vice versa.

The computer algorithm used for this accesses all the data of the pairs registered and calculates precisely which pairs are suitable for a crossover transplantation on the basis of their immunological structure.

The logistical challenge for this transplantation, which receives close psychological support, is that it must take place simultaneously but the respective donors and recipients may not get to know each other. It is done in anonymised form. In the case above the husband's kidney was incompatible for his wife, who had already received two transplants and was a dialysis patient. The same thing applied to a couple of brothers. But as a "crossover" the kidneys could be transplanted. "The whole thing worked sensationally well," concludes Georg Böhmig, "the patients were able to leave hospital after a few days."

The transplanted kidneys also function without having to be "desensitised", this means without having to have the antibodies washed out of the blood – as is otherwise customary in many cases.

The aim now is to construct a whole chain of crossover donors in Austria as is already the case in many other countries worldwide. The centres in Innsbruck, Graz and Linz have already announced their readiness to participate. This Austria-wide programme is set to start up in the coming year.

More information: "Transnational validation of the Australian algorithm for virtual crossmatch allocation in kidney paired donation." Georg A. Böhmig, Samantha Fidler, Frank T. Christiansen, Gottfried Fischer, Paolo Ferrari. *Human Immunology*, Volume 74, Issue 5, May 2013, Pages 500–505. [dx.doi.org/10.1016/j.humimm.2013.01.029](https://doi.org/10.1016/j.humimm.2013.01.029).

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