Brain structure of kidney donors may make them more altruistic

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(Medical Xpress)—People who donate kidneys to strangers have significantly different brain structures than those who don't.

That's the finding of a study published in today's *Proceedings of the National Academy of Sciences* (*PNAS*) by Georgetown researchers.

Abigail Marsh, PhD, associate professor of psychology at Georgetown, worked with John VanMeter, PhD, associate professor of neurology and director of the Center for Functional and Molecular Imaging at Georgetown University Medical Center, to scan the brains of 19 altruistic kidney donors.

More sensitive to distress

"The results of brain scans and behavioral testing suggest that these donors have some structural and functional brain differences that may make them more sensitive, on average, to other people's distress," Marsh explains.

The Georgetown researchers used functional MRI to record the neural activity of the kidney donors and 20 control subjects who had never donated an organ as they viewed faces with fearful, angry or neutral expressions.

Underlying neural basis

In the right amygdala, an emotion-sensitive brain region, altruists displayed greater neural activity while viewing fearful expressions than did control subjects.

When asked to identify the emotional expressions presented in the face images, altruists recognized fearful facial expressions relatively more accurately than the control subjects.

"The brain scans revealed that the right amygdala volume of altruists is larger than that of non-altruists," Marsh says. "The findings suggest that individual differences in altruism may have an underlying neural basis."

Opposite from psychopaths?

These findings dovetail with previous research by the professor showing structural and functional brain differences that appear to make people with psychopathic traits less sensitive to others' fear and distress.

These differences include amygdalae that are smaller and less responsive to fearful expressions. People who are unusually altruistic may therefore be the opposite in some ways from people who are psychopathic.

To find kidney donors, the researchers reached out to the Washington Regional Transplant Community (WRTC), a federally designated organ procurement organizations.

A donor's story

HarHarold Mintz, former northern Virginian who volunteered with WRTC and agreed to partparticipate in the Georgetown study, donated a kidney to an anonymous stranger he later learlearned was an Ethiopian refugee who had settled in Washington, D.C.

Mintz, who now lives in California and speaks to high school students about his 2000 donation, says a series of events over time led him to supply the kidney, including his father dying of cancer diagnosed too late at the age of 56.

One Valentine's Day in 1988, Mintz and his wife were at the mall and Mintz noticed parents with a sign saying "Please Save Our Daughter's Life." He walked past them, then turned around and asked what they needed, and it turned the daughter had leukemia and needed a bone marrow transplant.

Mintz and his wife decided to donate blood to see if either of them were a match. But no match was found and Mintz later noticed the daughter's obituary in the newspaper.

Stories taken to heart

Mintz also was surprised to hear that although their daughter had just died, the parents thanked everyone who tried to help and expressed hope that they might help someone else.

"All these stories just kind of stuck inside my head and every time I'd see a story about a medical story of distress, it would just kind of get put away in a file inside my heart," Mintz says.

Marsh notes that kidney disease is now the eighth-leading cause of death in the U.S., and that living kidney donations are the best hope for restoring people to health who have kidney disease.

"Dr. Marsh's work is a great example of how fMRI can be used to provide insight into how differences in the brain's response can lead individuals to perform such magnanimous acts," VanMeter says.

More information: Abigail A. Marsh, Sarah A. Stoycos, Kristin M. Brethel-Haurwitz, Paul Robinson, John W. VanMeter, and Elise M. Cardinale "Neural and cognitive characteristics of extraordinary altruists," *PNAS* 2014 ; published ahead of print September 15, 2014, DOI: 10.1073/pnas.1408440111

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