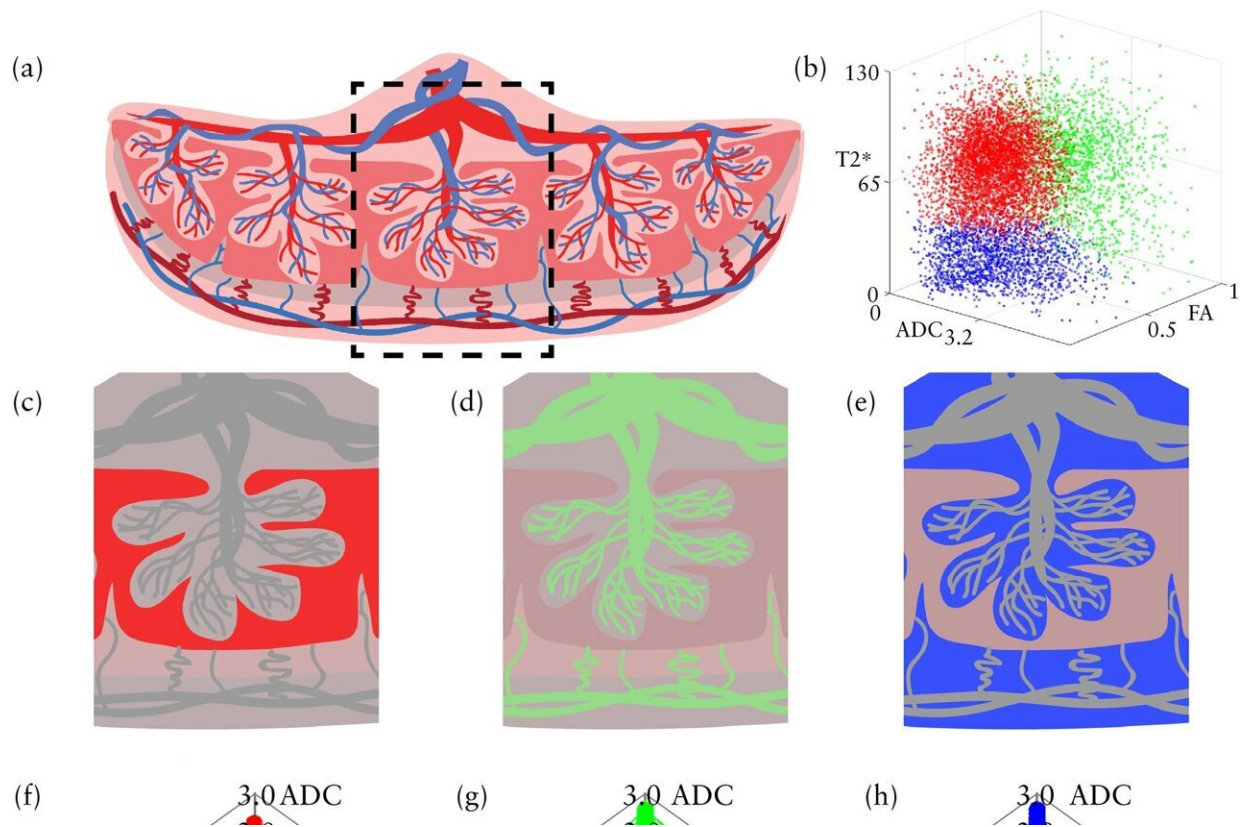


New MRI method provides detailed view of placenta during pregnancy

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(a) Cross-sectional schematic diagram of placenta showing five cotyledons. (b) Three-dimensional graph showing multivariate mixture distribution. (c–e) Schematic diagrams revealing three compartments of the cotyledon outlined with dashes in (a): intervillous space (IVS) (c), maternal and fetal placental vessels (PV) (d) and placental tissue (PT) (e). (f–h) Radar plots displaying magnetic resonance imaging parameters of 22 healthy pregnancies in each cluster. (i–k) Boxplots showing mean fractional anisotropy (FA) (i), T2* (j) and axial diffusivity (AD) (k) values of the three clusters. Each circle represents one

patient, box is interquartile range, horizontal line within box is median, whiskers are 5th and 95th percentiles and + is mean. All analyses were performed on three-dimensional data. ADC, apparent diffusion coefficient; RD, radial diffusivity. Credit: *Ultrasound in Obstetrics & Gynecology* (2022). DOI: 10.1002/uog.24959

Researchers have developed a new method to process MRI scans to reveal the distinct compartments of the placenta, take measurements of oxygen levels in each region and determine if there are malformations in blood vessels (i.e., placental lesions). Obtaining this level of detail is currently not possible using standard MRI analysis methods. The small study was supported by NIH's Human Placenta Project, which is led by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

The study team, led by Yong Wang, Ph.D., at Washington University in St. Louis and Alison Cahill, M.D., at the University of Texas at Austin, developed analysis methods for MRI scans that are routinely collected in hospitals and [healthcare facilities](#). Importantly, these types of MRI scans do not require contrast agents, which are only used during pregnancy for limited circumstances.

The team's machine learning method automatically processes MRI data to visualize separate placental compartments, including the intervillous space (the area where maternal blood enters to provide nutrients and gas exchange), placental vessels and placental tissue. Unlike current MRI analysis methods, which can only measure placental oxygen as an average across the entire organ, the new method can characterize [oxygen levels](#) within these discrete compartments.

The study team also used these region-specific measurements to look for differences between 22 study participants with healthy pregnancies and

five participants who went on to develop pregnancy complications. While they did observe trends—highlighting the potential for this technique to detect specific pregnancy complications—further analysis is needed among larger groups of study participants.

Overall, the new method can serve as an objective, quantitative method to assess placental health during pregnancy. With additional validation and refinement of this technique, the method may be used by [healthcare providers](#) as a tool in the care of pregnant patients, especially those at risk for pregnancy complications. Early monitoring of the placenta can lead to better detection and prevention of pregnancy complications, including preterm birth, fetal growth disorders and preeclampsia.

The work is published in the journal *Ultrasound in Obstetrics & Gynecology*.

More information: Z. Sun et al, Association of intraplacental oxygenation patterns on dual-contrast MRI with placental abnormality and fetal brain oxygenation, *Ultrasound in Obstetrics & Gynecology* (2022). [DOI: 10.1002/uog.24959](https://doi.org/10.1002/uog.24959)

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