Investigating the placenta: Discovery shows why this often-overlooked organ should be given more attention

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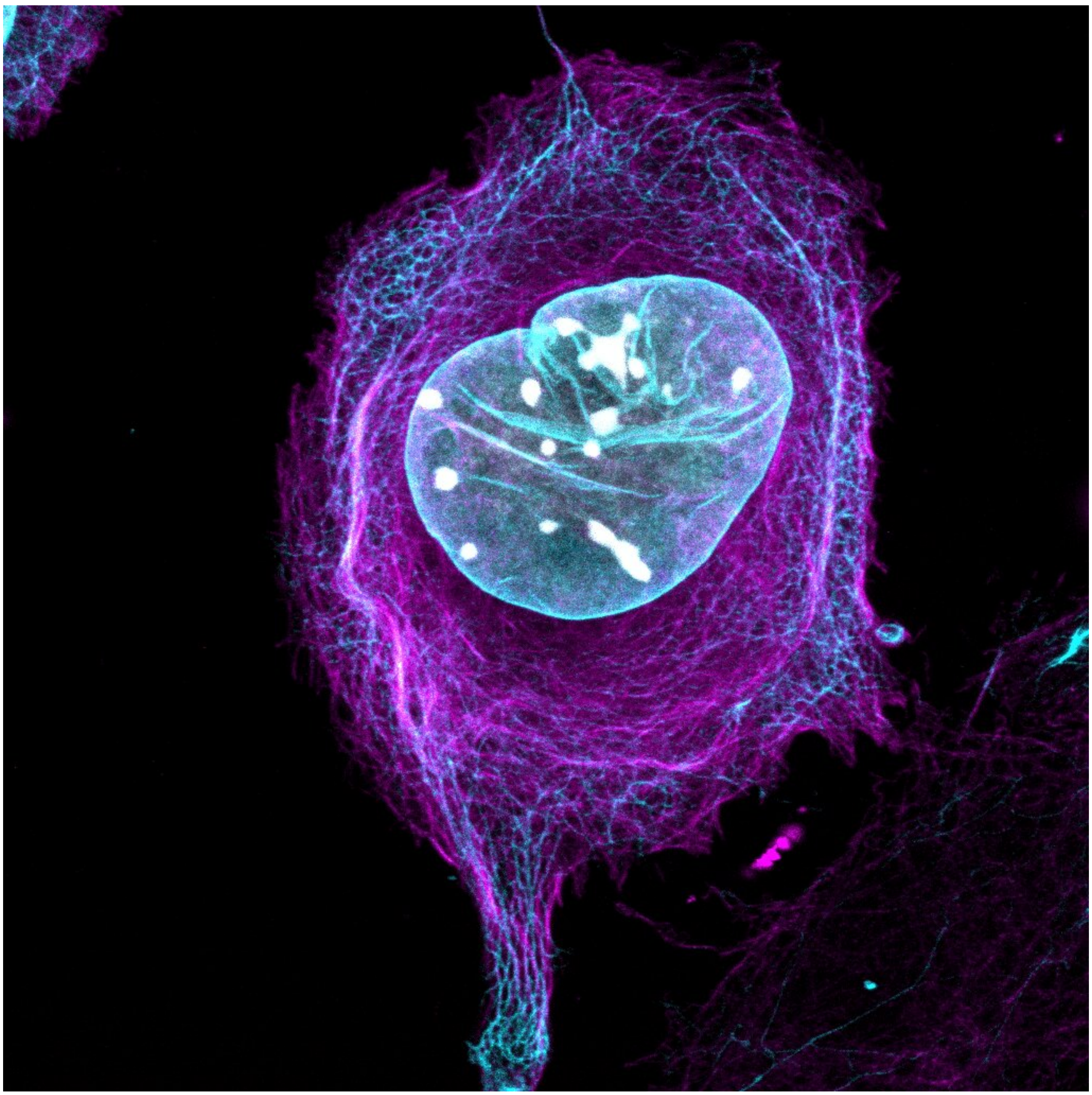


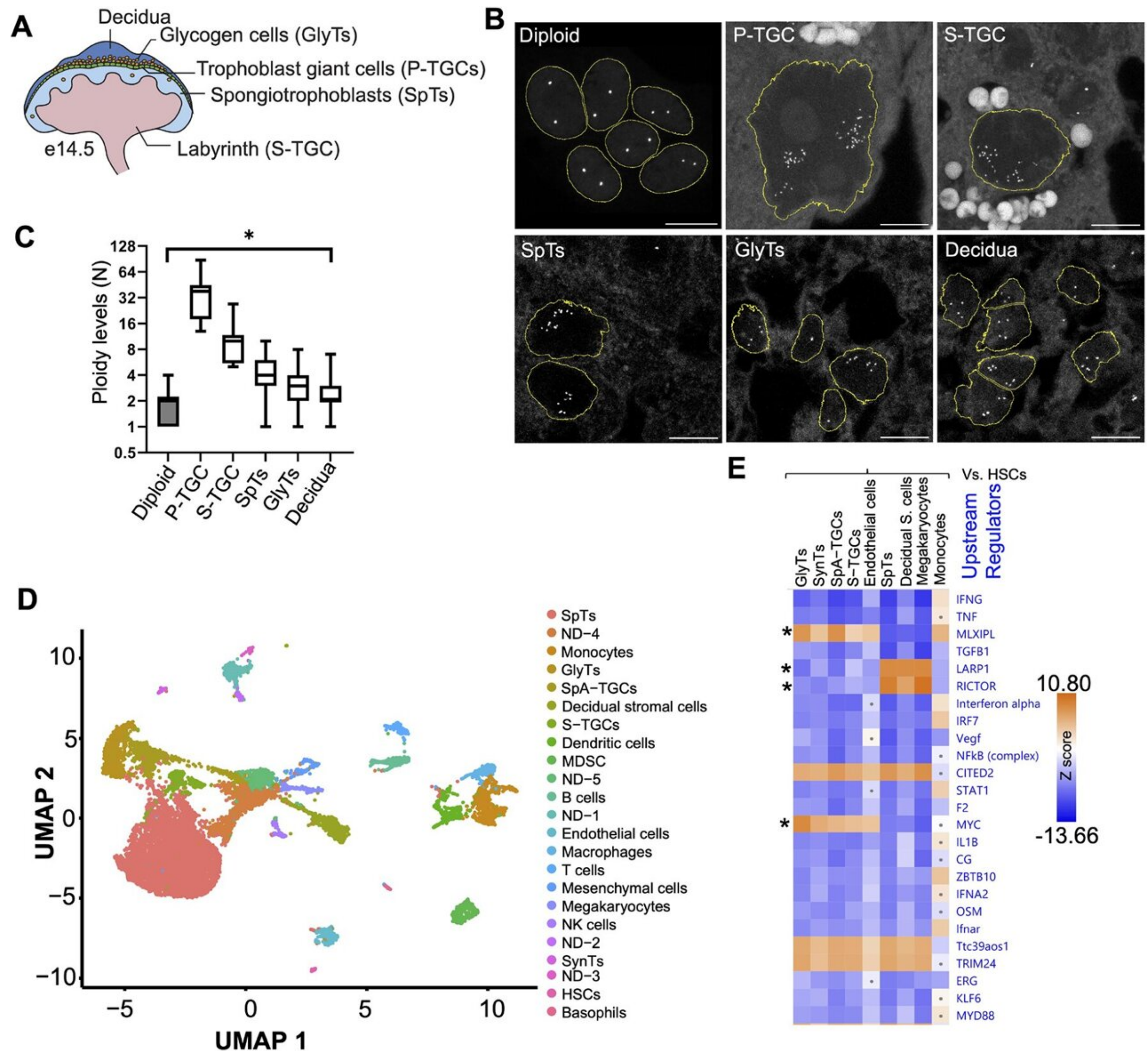
Graphical schematic of fully developed mouse placenta at 14.5 days post conception (top). Fluorescent images of various placental cell types illustrating multiple genome copies (white dots) within cells (bottom). Credit: Stowers Institute for Medical Research

The placenta, critical for healthy embryo development, is a multi-purpose organ with a precise lifespan—the length of a pregnancy. New research from the Stowers Institute for Medical Research suggests that further exploration of the placenta's roles and capabilities may one day lead to insights for positive pregnancy outcomes.

The study published in *Development* focuses on a unique property of many cells comprising the placenta that explains how these cells perform essential functional and physical roles to support a developing embryo.

"Following birth, the placenta is often tossed in the medical wastebin," explained Stowers Investigator Jennifer Gerton, Ph.D. "This makes it the most overlooked, undervalued, and understudied organ in reproductive science."

Placental cells are very large and have high metabolic activity, enabling them to serve as a physical barrier and to facilitate nutrient and hormone exchange between mom and baby. New insights from research performed on mice led by former Postdoctoral Researcher Vijay Singh, Ph.D., from the Gerton Lab, could help researchers and clinicians understand in greater detail how the placenta supports healthy human pregnancies.



Many placental cells are polyploid and show alterations in the Myc and inflammatory pathways. (A) Schematic of the fully developed mouse placenta with different layers and cells. (B) DNA fluorescence in situ hybridization using 5S rDNA as a probe to show the number of copies of the genome in various placental cell types at 14.5 dpc using 10 µm paraffin wax-embedded sections. These are the maximum projection from z stacks. Trophoblast stem cells were used as diploid controls. n=3 biological replicates. Scale bars: 10 µm. (C) Quantification of the number of 5S rDNA foci from different cell types. Diploid, n=17; P-TGCs, n=11; S-TGCs, n=8; SpTs, n=168; GlyTs, n=156; decidua, n=144). The box plot shows the ploidy of various cell types. In box plots, boxes represent interquartile range and whiskers represent minimum and maximum values. *P