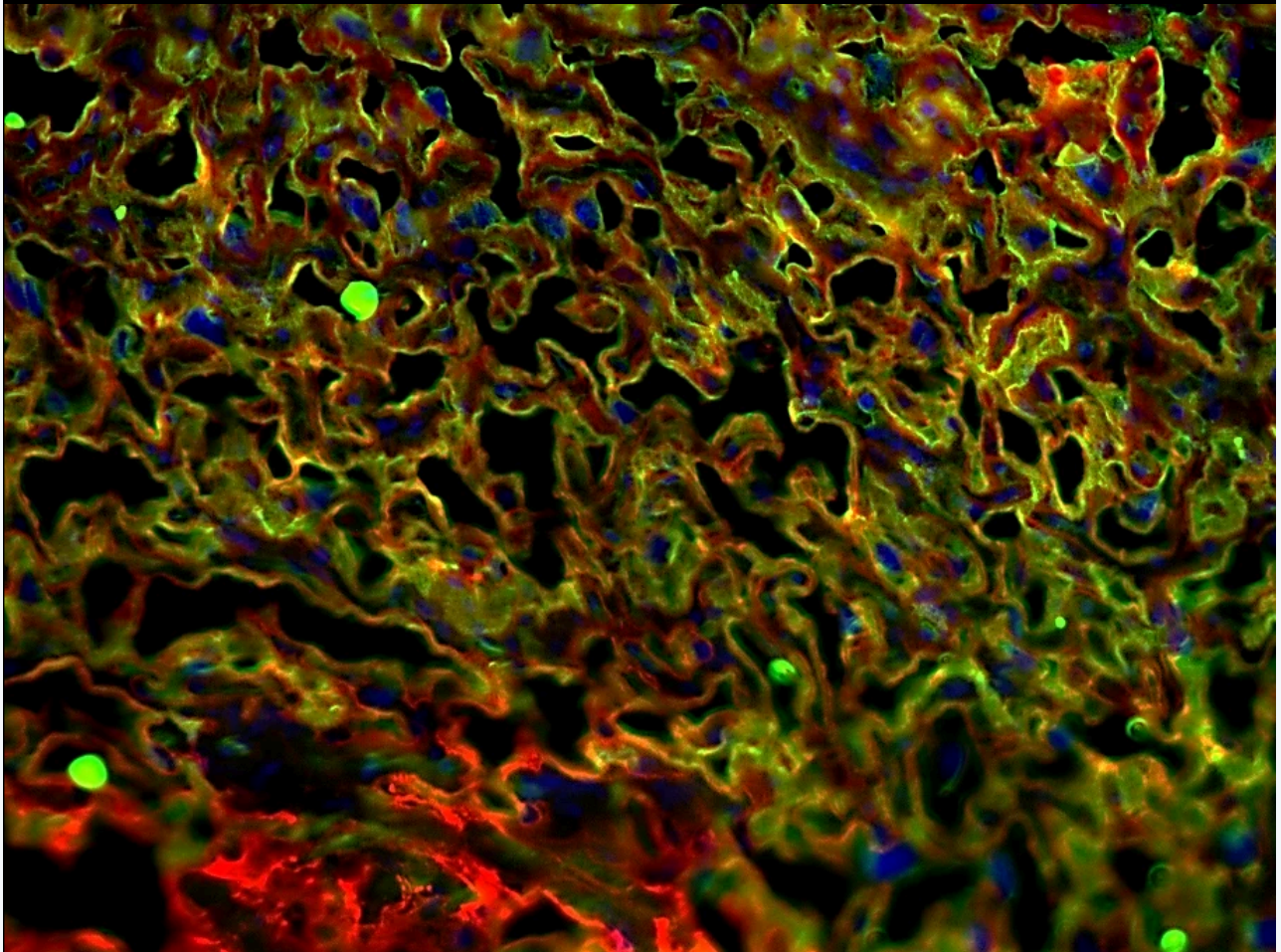




Okun
Lab

Inside Our Research



The Labyrinth Between Mother and Child

The placenta is one of the most remarkable organs in the body. Built during pregnancy and shared between mother and fetus, it creates an intimate meeting place between two individuals, allowing oxygen and nutrients to reach the developing fetus while carrying waste products away.

This image from our research shows a region of the mouse placenta called the labyrinth, named for the intricate maze of blood vessels and cells that weave through it. Here, fetal blood vessels (green) wind through layers of specialized placental cells called trophoblasts (red).

But hidden within this maze is another story.

In this experiment, the mother does not carry a fluorescent marker, while the father does. As a result, cells originating from the developing fetus can be identified by their RFP fluorescence (yellow). This allows us to distinguish fetal material within the placenta and follow what happens to it during pregnancy.

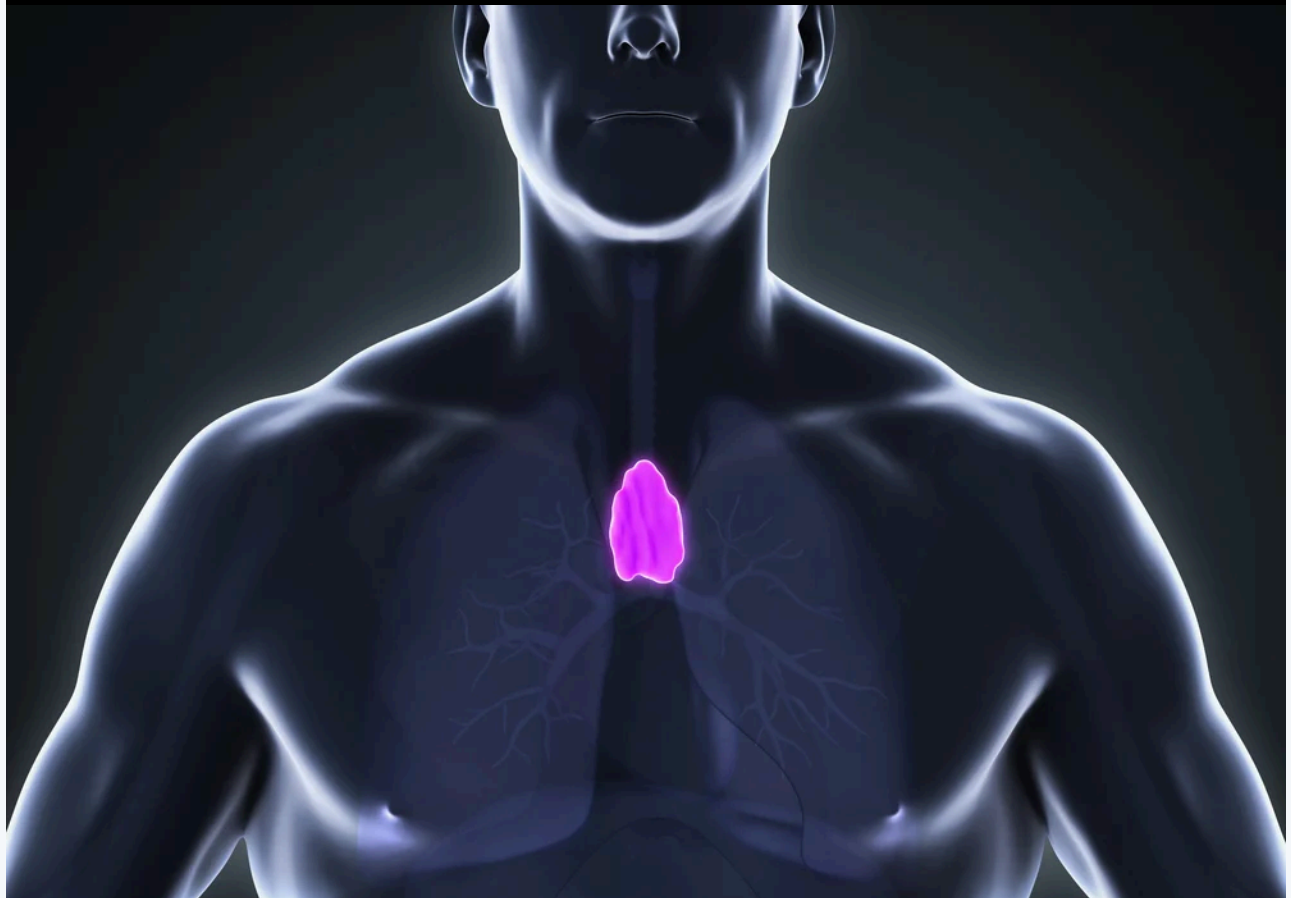
The placenta is not an impenetrable wall. Although maternal and fetal blood normally remain separated, there is a remarkable biological exchange across their interface. Small numbers of fetal cells and fetal-derived material can cross the placenta and enter the mother's circulation, a phenomenon we study as fetomaternal transfer. Some fetal cells can even remain in maternal tissues long after pregnancy has ended, a phenomenon known as fetal microchimerism.

Our laboratory studies what is transferred from fetus to mother, where it travels, and whether these tiny biological messages can influence the mother's body and brain both during pregnancy and later in life.

So, if you have ever felt that your child will always be a part of you, biology suggests that you may be more right than you realized.

Image credit: Tamir Hirsh. Fluorescent imaging of labyrinth from placental tissue taken from a mouse pregnancy. The Paul Feder Okun Laboratory for Alzheimer's Disease Research.

Highlights From The Field



**The Disappearing Organ That
Could Hold the Key to Healthy
Aging**

Tucked behind the breastbone lies the thymus, a small immune organ that plays a vital role in training the body's T cells to recognize infections and protect us from disease. Unlike most organs, however, the thymus begins to shrink soon after puberty and gradually loses much of its function with age. Scientists now believe this decline may contribute to weakened immunity, chronic inflammation, and an increased risk of age-related diseases.

Researchers around the world are exploring ways to rejuvenate the aging thymus, including regenerative therapies, engineered tissues, and drugs that stimulate new immune cell production. While many of these approaches are still in the early stages, restoring thymus function could one day strengthen immune defenses, improve vaccine responses, and even help promote healthier aging. The once-overlooked organ is now emerging as an exciting new frontier in longevity research.

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The Paul Feder Laboratory for Alzheimer's disease research
The Gonda Multidisciplinary Brain Research Center
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