



# Immune Isolating Device with Improved Diffusion for Grafting Donor Tissue and Restoration of Endocrine Function

**TECHNOLOGY NUMBERS:** 6651, 2025-031, 2024-096, 2023-500, 2019-006, 2019-005, 2020-052

**Accelerate Blue Foundry - 2025 (Life Sciences)**

## OVERVIEW

This dual-layer hydrogel capsule enables safer, longer-lasting ovarian tissue grafts by improving nutrient delivery and mechanical stability. This technology enables natural, body-regulated hormone production and release for patients whose ovarian endocrine function has been lost to cancer therapies, immune suppression, or ovarian failure. Unlike hormone replacement therapy, which only eases symptoms, implantation of immunoisolated ovarian tissue physiologic ovarian function eliminates the health risks of premature menopause, including osteoporosis and cardiovascular disease. With potential applications to address age-related endocrine decline, this work aims to transform women's health and long-term quality of life.

## DESCRIPTION

The immunoisolating device consists of a two-layer hydrogel capsule that houses ovarian tissue. The outer layer is non-degradable and prevents infiltration of immune cells reducing the risk of rejection. To facilitate diffusion of soluble factors and oxygen through the hydrogel wall we embedded temperature-sensitive gelatin microgels that dissolve upon implantation, creating an immunoisolating barrier with improved diffusion. The inner layer is degradable and securely holds the ovarian tissue in place and allows follicle growth and expansion, while the overall dual-layer design offers stronger protection and flexibility than older single-layer capsules. This new approach directly addresses previous barriers in ovarian tissue grafting, delivering superior graft health by increasing both mechanical support and biological function.

These immune isolating capsules have been extensively studied at the preclinical level, with successful mouse and non-human primate studies, demonstrating survival and hormone production for six months in ovariectomized hosts, and passing third-party safety and dosing testing.

## Technology ID

6651

## Category

Therapeutics and Vaccines  
Life Sciences  
Accelerate Blue Foundry -  
2025/Life Sciences

## Inventor

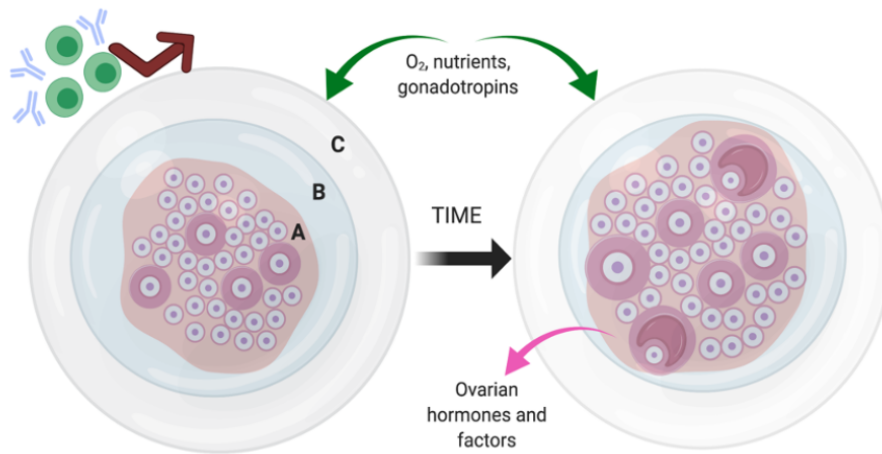
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## View online



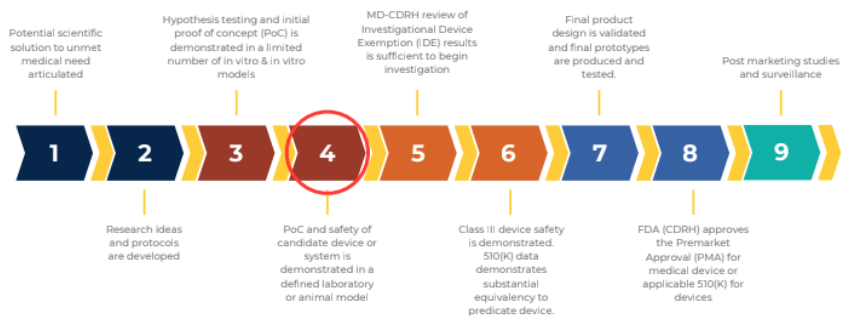


## VALUE PROPOSITION

- Greatly improves nutrient and oxygen delivery to ovarian tissue, enabling longer-lasting and healthier grafts.
- Provides stronger immune protection and mechanical durability compared to single-layer capsule systems.
- Adaptable platform with potential use for other tissue grafts needing immune isolation and enhanced nutrient access.
- Restores healthy physiology and hormones.

## TECHNOLOGY READINESS LEVEL

### Medical Device Technology Readiness Levels



## INTELLECTUAL PROPERTY STATUS

ALL ISSUED PATENTS:

- [US10918673](#)
- [US11786560](#)

Other patent applications pending.

## MARKET OPPORTUNITY

This solution answers urgent needs in hormone restoration, especially for girls with ovarian insufficiency due to anti-cancer treatments or women with premature ovarian failure , and also serves transplantation and regenerative medicine fields. Its improved graft health makes it valuable for endocrinology and reproductive specialists, and transplantation medicine providers. Broader opportunities exist in tissue engineering and cell therapies seeking better immune protection and nutrient delivery.

The global hormonal replacement therapy market is expanding rapidly, fueled by more cancer survivors, and an increased focus on aging and longevity, with industry reports projecting sustained growth and rising demand for proven, innovative grafting solutions like this dual-layer capsule.

- Through NSF Innovation-Corps Customer Discovery, interviews revealed strong support from insurers, clinicians, patients, and families for translating this technology to the clinic.