

# THE PLATELET-DERIVED FACTOR CONCENTRATED-FIBRIN HYDROGEL AS AN ANTI-FIBROTIC AND REGENERATIVE AGENT FOR ACUTE ENDOMETRIAL INJURY

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## **Abstract Body**

With the recent development of fertility preservation and assisted reproductive technology, methods of obtaining and preserving healthy germ cells are widely used. However, the failure of embryo implantation or maintaining pregnancy due to abnormalities in the uterine environment is one of the major causes of reducing the pregnancy rate. Factors affecting implantation failure include genetic defects in the embryo, microenvironmental problems in the endometrium (EM), fibrosis, or congenital anomalies of the uterus. In this study, we focused on EM fibrosis which is caused by mechanical trauma, inflammation, or radiation therapy. Hence, we developed an anti-fibrosis and wound healing technology based on the blood coagulation mechanism and platelet-derived factors (PFCs) that can be applied immediately after the occurrence of physical trauma to prevent fibrosis of the EM in advance. An acute wound was induced by infusion of 0.25N hydrochloric acid into the uterine cavity of mice, and then the allogenic platelet-derived factor concentrated-fibrin hydrogel (PFC-FH) was applied to compare the progression of fibrosis over time. As a result, the histological and molecular data showed severe fibrosis in damaged EM after 28 days, while the PFC-FH treated EM showed a similar state to normal mice. The tissue regeneration effects of PFC-FH in EM were verified by natural mating, histochemical stains (Col1, FOX2a, etc.), and molecular analysis. Likewise, we discovered that the main regulatory mechanisms of EM fibrogenesis were epithelial-mesenchymal transition (EMT), senescence, and inflammation by confirming related markers such as Twist1, Cdh, Snai1, p16, p21, LaminB1, Il-6, and Il-1b. In conclusion, we developed a safe, cost-effective PFC-FH treatment that can be applied as an anti-adhesive, anti-fibrotic agent and help tissue regeneration by fostering the appropriate microenvironment of EM.