

EMBRYO GLUE - TRENDS & CHALLENGES - REVIEW ARTICLE

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ABSTRACT

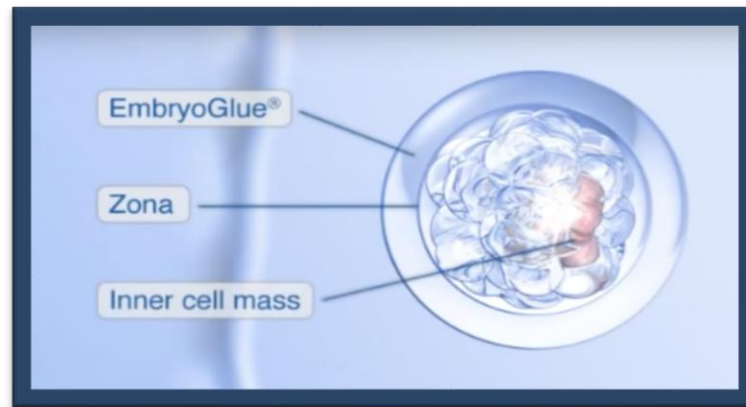
Being pregnant is a wonderful time because it brings the happiness and satisfaction of creating a new life. Pregnancy is more than just a physical transformation of the female body; it is also an emotional transformation that has an everlasting impact on life and completely changes one's outlook. Infertility is a serious problem for many couples in this decade, and it may be a difficult and frustrating experience for them. As a result, assisted reproductive technologies are largely employed to treat infertility, hence encouraging Vitro Fertilisation and increasing pregnancy rates. Embryo Glue, an implantation-promoting transfer medium containing a component known as Hyaluronan, was recently used in embryo transfer. During the settling process, this tissue adhesive generates a milieu in the uterus for optimal embryo invasion. This is especially useful for customers who have a high failure rate during implantation while having a most likely donor cycle.

KEYWORDS: *In-vitro fertilization, Hyaluronan, Implantation, Pregnancy, Embryo transfer*

INTRODUCTION

Being pregnant is a happy, hopeful, and exciting time. Couples who are married now go to fertility services to get pregnant. Also, because they can't have children, many couples are socially isolated and mentally upset¹. Assisted reproductive methods are the main way that infertility is treated these days, and they are making it possible for many couples to have children². In vitro fertilisation and egg transfer are now more common, and the rise in technology has made it easier for people to get pregnant. Even with these improvements, the implantation of eggs is still hard for doctors. There are a lot of things that could have gone wrong with a woman's IVF implantation, but one of the most common is that the sticky matrix of the endometrium and the transferred embryo in the uterus

did not connect properly³. Harper and his colleagues created a medium-sized Embryo glue in 2003. It is designed specifically for embryo transfer and is the only product on the market that has been shown to improve implantation because it contains a lot of hyaluronan, which helps the embryo stick to the womb⁴.



Source: <https://www.careivfkolkata.com/Treatment/Embryoglue>

EMBRYO GLUE

a unique culture medium created specifically for the embryo transfer process that uses biochemical cues to facilitate the embryo's attachment to the uterine mucous membrane. With a high concentration of hyaluronan and human recombinant albumin to facilitate embryo implantation into the womb, the solution's composition is ideal. Hyaluronan functions as a bridge between the uterine surface and the embryo, minimises drift and has a texture akin to that of the fluid found in the womb. This facilitates the embryo's spontaneous conception-like implantation in the womb⁵.

INGREDIENTS OF EMBRYO GLUE

A higher concentration of hyaluronic acid (0.5 mg/mL) and a lower concentration of human recombinant albumin (2.5 mg/mL) are the components that make up embryo glue. There is a presence of hyaluronan glycosaminoglycan in both the uterine cavity and the oviduct, and its presence rises during the process of implantation. The female reproductive system contains a significant amount of albumin, which is a source of energy, hormones, vitamins, and metals. Albumin is also found in its abundance. When the embryo transfer procedure is carried out, albumin not only contributes to the viscosity of the culture media, but it also serves as a lubricant, making it easier to handle the embryos and preventing them from adhering to the culture plate.⁶



Source:<https://www.primefertilitycenter.com/en/getting-to-know-embryo-glue-an-implantation-promoting-medium/>

INDICATIONS OF EMBRYO GLUE

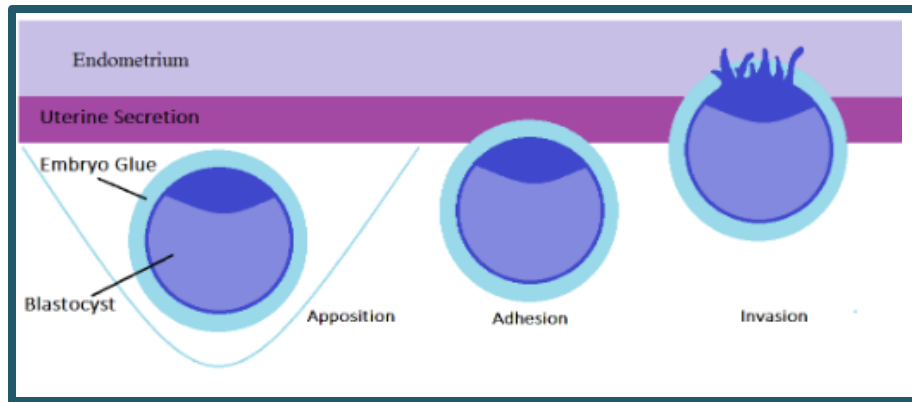
The utilization of embryo adhesive can provide advantages for the subsequent mothers:

- Advanced age of the mother.
- Inadequate performance of the implant, even in the most likely donor cycle.
- Damaged, obstructed, or deformed fallopian tubes
- implantation complications, especially in cases where the uterine environment and embryo quality were both optimal.
- Consecutive implant failure.
- At least two unsuccessful IVF cycles.
- Undiagnosed infertility⁷.

EMBRYO GLUE APPLICATION AND ITS PROCESS

STAGE 1 - APPOSITION

During embryo transfer, the embryos are immersed in a substance known as 'glue' and subsequently inserted into the uterus. The adhesive properties and elevated viscosity of the glue facilitate the blending of the contents of the transfer medium, known as Embryo glue, with the uterine fluid. This results in a close interaction between the embryo and the endometrium, allowing the embryo to remain within the uterine lumen. This reduces the undesired displacement of the embryo within the uterus.⁸



Source: <https://www.babyjoyivf.com/embryo-glue/>

STAGE 2 - ADHESION

- In this stage the glue encourages the embryos to adhere, by the enzymes released by the uterus which boost the adhesion rate. By virtue of these qualities, it improves the apposition and adhesion which are crucial phases in the process of implantation. Additionally, it enhances the thickness of a substance, streamlines the procedure of transferring embryos, and consequently safeguards against the ejection of embryos from the uterine canal after the transfer.
- Hyaluronan is a linear polysaccharide with a high molecular weight. It is made up of repeating units of N-acetyl-D-glucosamine and D-glucuronic acid. It engages in autocrine and paracrine communication with the uterine cavity, facilitating embryological development, migration, adhesion, proliferation, and cell differentiation.
- Both the transplanted embryo and the endometrium of the uterus exhibit the presence of cell surface glycoprotein CD44, which serves as the receptor for Hyaluronan. Consequently, the Hyaluronan molecules found in the Embryo glue efficiently fulfil the role of connecting the CD44 receptors on the embryo with the CD44 receptors of the endometrium, thus strengthening the connection between the embryo and the uterine cavity⁹.

STAGE 3 - INVASION

The embryo settles into a favourable place at this stage due to the cohesiveness between the cells of the embryo and the endometrial lining, and the implantation begins by invading the cells and is followed by its effective development⁹.

BENEFITS OF EMBRYO GLUE

- Increases the likelihood of a successful implantation by 34%, which increases implantation.
- Enhanced live birth rates by 10% and clinical pregnancy rates by 21%.
- The viscous hyaluronan thickens the embryo, preventing embryos from drifting and lowering the risk of an ectopic pregnancy.
- Hyaluronan has no negative effects on the quality or structure of embryos¹⁰.

EFFECTIVENESS OF EMBRYO GLUE

Embryonic adhesive has been found to enhance the overall success rate of in vitro fertilisation (IVF) procedures. By simulating the uterine environment during implantation, this adhesive sustains the necessary temperature and other conditions. As a result, the embryos maintain optimal health during implantation, leading to a successful pregnancy¹¹. In their 2021 study, **Raghunandan K et al.** aimed to determine the impact of embryo glue as a transfer medium on live birth rate and implantation rate. The mothers in the test group applied embryo adhesive during transfer, while standard ET medium was utilised in the test group. Embryo glue substantially increased the overall implantation rate, the rate of multiple pregnancies, and the live birth rate, according to the findings. The positive impact was statistically significant among women aged 35 and older¹². In their prospective case-control study, **Neeta Singh et al. (2015)** investigated the impact of embryo glue as a transfer medium on the outcomes of in-vitro fertilisation cycles involving fresh non-donor embryos. For the experimental group consisting of 42 women, EmbryoGlue was utilised, whereas conventional culture medium was employed to transfer embryos in the control group. The findings indicated that the rate of clinical pregnancies in the experimental group was 7% greater than that of the control group. Successful implantation was observed in 50% of patients with a history of IVF failure within the study cohort⁴.

COST & RISKS OF EMBRYO GLUE

The cost of embryo glue can vary a lot based on where you live, which clinic you go to, and the details of your treatment plan. Embryo glue costs about Rs.15,000 to Rs.20,000 in Delhi and Rs.5,000 to Rs.10,000 in Tamil Nadu. For the most exact and up-to-date price information, it's usually best to contact fertility clinics directly. People who use Embryo Glue don't seem to be at

risk for harm to the mother or birth problems in the babies. However, several hundred live births have been reported after hyaluronan was used in culture medium¹².

CONCLUSION

Embryo Glue is an effective remedy for in vitro fertilisation (IVF). In the event that a couple decides to incorporate it into their treatment, they will establish a happy outcome for themselves. The implantation of embryos is made easier with the help of this cutting-edge technique, which is also the safest. This method has the highest success rate in embryo transfer and poses the least amount of risk. The reason for this is because it is the procedure that is most popular among fertility specialists and embryologists, and it is a significant step forward in the field of in vitro fertilisation.

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CONFLICTS OF INTEREST: NIL

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