# Endometrial Assessment in the Prediction of Pregnancy Outcome after Embryo Transfer

**Thesis**

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# Glossary of Terms

| | |
|---|---|
| ART | Assisted Reproductive Technology |
| ASAs | Antisperm Antibodies |
| BMPs | Bone Morphogenetic Proteins |
| BTEB1 | Basic Transcription Element-Binding Protein 1 |
| CDK | Cyclin Dependent Kinase |
| DEDD | Domain-Containing Protein |
| EMJ | Endometrial-Myometrial Junction |
| EPDA | Intraendometrial Power Doppler Area |
| FET | Frozen-Thawed Embryo Transfer |
| FI | Flow Index |
| Foxa2 | Forkhead Box A2 |
| HB-EGF | Heparin-Binding Epidermal Growth Factor |
| hCG | Human Chorionic Gonadotropin |
| Hmx3 | Homeobox 3 |
| Hoxa | Homeobox A |
| Hurp | Hepatoma Upregulated Protein |
| ICSI | Intra-Cytoplasmic Sperm Injection |
| IGF | Insulin-Like Growth Factor |
| IHH | Indian Hedgehog |
| IL-11Rα | Interleukine-11 Receptor A |
| IUAs | Intrauterine Adhesions |
| IUI | Intrauterine Insemination |
| IVF | In-Vitro Fertilization |
| IVF-ET | In-Vitro Fertilization And Embryo Transfer |

| | |
|---|---|
| MR | Magnetic Resonance |
| NPV | Negative Predictive Value |
| OHSS | Ovarian Hyperstimulation Syndrome |
| PCOS | Polycystic Ovarian Syndrome |
| PDZ | Primary Decidual Zone |
| PI | Pulsatility Index |
| PPV | Positive Predictive Value |
| PZD | Partial Zona Dissection |
| RI | Resistance Index |
| ROC | Receiver-Operating Characteristic |
| ROI | Region-Of- Interest |
| SDZ | Secondary Decidual Zone |
| SNP | Single Nucleotide Polymorphism |
| SRC | Steroid Receptor Coactivator |
| STAT | Signal Transducer And Activator Of Transcription |
| TGF-β | Transforming Growth Factor- B |
| VEGF | Vascular Endothelial Growth Factor |
| VFI | Vascularisation Flow Index |
| VI | Vascularisation Index |
| VOCAL | Virtual Organ Computer-Aided Analysis |
| ZD | Zona Drilling |

**Alphabetically ordered.**

# Introduction

Embryo implantation depends on the quality of the ovum and endometrial receptivity. Endometrial receptivity is a temporally unique sequence of factors that make the endometrium receptive to embryonic implantation. Implantation window is a period during which the endometrium is optimally receptive to implanting blastocyst **(Aboubakr et al., 2004).**

Observations suggest that prospective assessment of the quality of decidualization response in the endometrium may be an important tool for predicting the likelihood of successful implantation and pregnancy outcome. Since its introduction into the clinic, ultrasound has been used widely to assess uterine features such as endometrial thickness, endometrial pattern and uterine blood flow that may be predictive of pregnancy, especially in the context of assisted reproductive technology **(Abdallah et al., 2012).**

A thin endometrium is one of the most difficult problems encountered in assisted reproduction every day practice. Whether a daily dose of 150 IU HCG for 7 days concomitant with estrogen administration in estrogen replacement cycles can increase the endometrial thickness and improve pregnancy outcome **(Papanikolaou et al., 2013).**

Precise and specific endometrial maturational development is crucial in allowing implantation following assisted reproduction. As endometrial biopsy is invasive and hormonal milieu assessment inaccurate, the need to evaluate endometrial development encouraged the use of high-resolution ultrasonography as an alternative non-invasive method of assessment for uterine receptivity. Ultrasonographic endometrial thickness measurement, endometrial pattern investigation, endometrial volume computation, uterine and subendometrial blood flow analysis by Doppler sonography are just some of the methods that we can utilize to have an idea of uterine receptivity and consequently to better predict pregnancy outcome following assisted reproductive technology cycles **(Senturk and Erel, 2008).**

Endometrial receptivity plays a crucial role in the establishment of a healthy pregnancy in cycles of assisted reproduction. The endometrium as a key factor during reproduction can be assessed in multiple ways, most commonly through transvaginal grey-scale or 3-D ultrasound. It has been shown that controlled ovarian hyperstimulation has a great impact on the uterine lining, which leads to different study results for the predictive value of endometrial factors measured on different cycle days. There is no clear consensus on whether endometrial factors are appropriate to predict treatment outcome and if so, which one is suited best **(Heger et al., 2012).**

There is a correlation between endometrial thickness measured on hCG day and clinical outcome in normal responders with GnRH antagonist administration. The pregnancy rate was lower in patients with endometrial thickness less than 7 mm compared with patients with endometrial thickness more than 7 mm **(Wu et al., 2014)**.

# Aim of the Work

To evaluate the Endometrial thickness and pattern as predictors of the ICSI success rate after Embyo Transfer.

**Study question:** In a woman undergoing ICSI, do the endometrial thickness and pattern affect the outcome?

**Study hypothesis:**

**Null hypothesis:** In a woman undergoing ICSI or ART, the endometrial thickness and pattern may affect the success rate after ET.

**Alternate hypothesis:** No effect.