GOALS OF THE INTERNSHIP

- Firsthand exposure to medical practice
- Participate in the creation of an original research project to be submitted for publication
- Learn about the science, medicine, and other factors that a reproductive endocrinologist must know to be a successful practitioner
CLINICAL ASPECTS

- Observed egg transfer procedures
- Accompanied Dr. Potter to surgery follow-ups, patient consults, and routine procedures like ultrasounds
- Viewed minor outpatient surgeries
Watched ICSI (intra-cytoplasmic sperm injection)

Observed the embryologists in the IVF (in-vitro fertilization) lab

Able to see the entirety of the IVF process from beginning to end
In IVF, eggs are harvested from the woman's ovary and fertilized in the laboratory with sperm. The embryos are then transferred into the uterus.
Go over the current science and medicine behind reproductive endocrinology
- Discussions with Dr. Potter
- Reading his book, *What to Do When You Can’t Get Pregnant*
- Research articles

Human reproduction, infertility, IVF, PGD, stem cells
“What’s the opposite of ‘Eureka!’?”
RESEARCH PROJECT

- Chosen topic: Implantation rates at various stages of embryonic development
  - Single embryo transfer cases
  - Screening for aneuploidy with PGD (pre-implantation genetic diagnosis) techniques
- Design: retrospective cohort study
- Researched similar past studies and found correlations with ours
METHODS

- Gather patient data from charts, IVF lab, etc.
- Come up with potential confounds and research data on these
  - Peak FSH levels, embryo grades, age of mother, IVF indication, and more
- Design an algorithm based on GSN (Gene Security Network) PGD scores, weighted by relative chromosome mass
  - Predict embryo implantation rates at certain stages of development
300K Microarray Measurements on Dad & Mom + Data from Human Genome Project (HapMap) + Noisy WGA Single Cell Array Measurements (300K)

Parental Support Algorithm

\[ P(f|D,M,F) = \frac{\sum_{(n^M,n^F)} P(n^M)P(n^F)P(D|n^M,n^F,M,F)}{\sum_{n} \sum_{(n^M,n^F)} P(n^M)P(n^F)P(D|n^M,n^F,M,F)} \]

Highly Reliable Single Cell Data

1. 24 Chromosome PGS with Parental Support™
2. Gene testing & 24 chromosome PGD with PS™
Blastomeres

- Most common technique
- Day 3 one or two cell analysis
- Potential effect of cell loss on implantation
- Potential negative effect on embryo development due to manipulation

Unpaired t-test to determine statistical significance

Group into early-stage and later-stage embryos

Does one group implant at a higher rate than the other?
RESULTS

- Later-stage embryos implant at a higher rate than early-stage embryos
  - Statistically significant data

- Age was the only confounding factor
  - There may exist a linking factor
    - Older women produce fewer high-quality embryos that mature
  - Peak FSH levels are the same between groups
We can help reduce the twinning rate if SET procedures become more successful.

We can predict more easily the implantation chance of a specific embryo, and also time the transfer better.

Future study, or an expansion of our own may be done with a control group that was NOT screened via PGD.
Currently still in the abstract writing phase
Will submit the abstract soon, most likely to ESHRE, the European Society of Human Reproduction and Embryology
- Possibly present abstract at one of their conferences as well
OVERALL THOUGHTS

- Fantastic and varied exposure to the medical field
- Gain insight into how much work goes into being a doctor, but at the same time how rewarding it can be
- How the medical field is always advancing and changing, so be prepared
QUESTIONS?