Objectives

- To correlate a measurable stimulation outcome parameter to its effect on blastocyst development, aneuploidy and pregnancy outcomes, and
- To determine if oocyte cohort maturity affects the implantation potential of a euploid blastocyst

Design

- A five-year (2014-2018) retrospective analysis was conducted on 1,265 autologous stimulation cycles using PGT-A and the resulting 1,002 vitrified-thawed euploid embryo transfers.
- Cycle cohort maturity was subdivided into patients with ≥70% mature eggs (Group 1) or below 70% (Group 2).

Conclusions

- **After a half decade of data collection, this study has identified a measurable outcome which predicts an increased risk of aneuploidy, a decreased euploid cycle outcome and embryos with a reduced implantation potential.**
- Cohort maturity is influenced by several factors, including age, AMH, FSH, stimulation protocol, and endocrine/ovarian conditions. **When those factors produce suboptimal maturity, cycles are adversely affected, likely due to incomplete cytoplasmic maturation of fertilized zygotes.**
- A further understanding of the genetic regulation/omics, oocyte in-vivo genetics and basic cell receptor biology is needed to better identify why suboptimal cycle maturity negatively effects the developmental potential of the pending blastocyst as assessed by PGT-A.

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Suboptimal Stimulation Is Predictive of Increased Aneuploidy and Impaired Euploid Blastocyst Implantation

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Methods

- Single physician clinic stimulated 1,023 patients/1,265 cycles.
- We evaluated the cohort of oocytes retrieved, and fertilized zygotes were grown to the blastocyst stage for PGT-A and vitrified for all cycles.
- Only the first transfer attempt was counted in the analysis.
- Stimulation protocols varied but were predominantly antagonist-based.
- Oocytes were retrieved 35.5-36 hr post-hCG trigger and cumulus complexes denuded 2-3 hr post-retrieval.
- Patient's percent mature oocytes were calculated as the # of metaphase II at denuding within the cohort.
- Comparisons using t-test and chi-square were performed for cycles failing to produce a blastocyst, cycles resulting in normal embryos, aneuploidy and implantation.

Results

Outcome	Group 1: ≥70% mature eggs/cohort	Group 2: <70% mature eggs/cohort	P value
# Cycles	797	226	n/a
Average Age	37	38	p<0.01
Average Mature/Cohort	88%	57%	p<0.01
Average # Blast/cycle	**5.7**	**2.7**	**p<0.01**
% Blast/Cycle	53%	51%	n/s
Aneuploidy Rate	**54%**	**61%**	**p<0.01**
Cycles Producing ≥ 1 Euploid Embryo	77%	59%	p<0.01
Implantation of SEET (single euploid embryo transfer)	**70%**	**61%**	**P<0.01**