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P-137 Validation of a novel artificial intelligence (AI) model assessing retrospective oocyte images to predict blastocyst PGT-A outcomes

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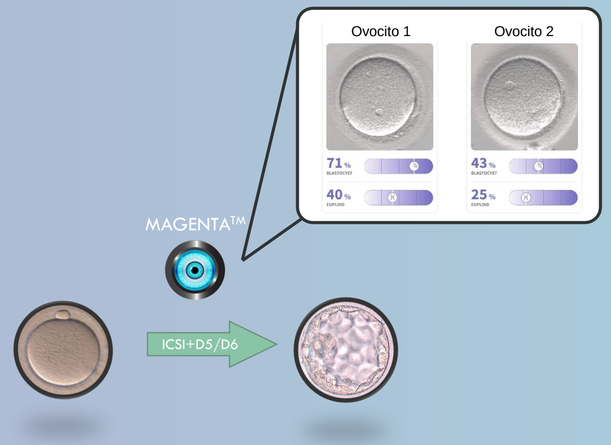
Introduction

Embryo chromosomal integrity is crucial to implantation and IVF success. PGT-A testing has been adopted to assess the genetic status of embryos and aid in blastocyst selection for transfer. However, high costs, invasiveness, and technical challenges introduce barriers for patient access. Most embryonic chromosomal abnormalities originate from maternal meiotic errors, making oocyte assessment a crucial opportunity to gain early genetic insights. However, non-invasive methods to evaluate the impact of oocyte quality on embryonic genetic integrity remain unavailable. Here, we validate the performance of a non-invasive, AI-powered oocyte assessment tool in predicting blastocyst ploidy (euploid/aneuploid) outcomes from the mature oocyte stage.

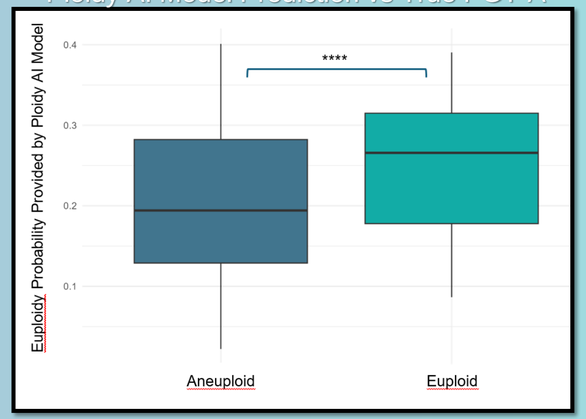


Methodology

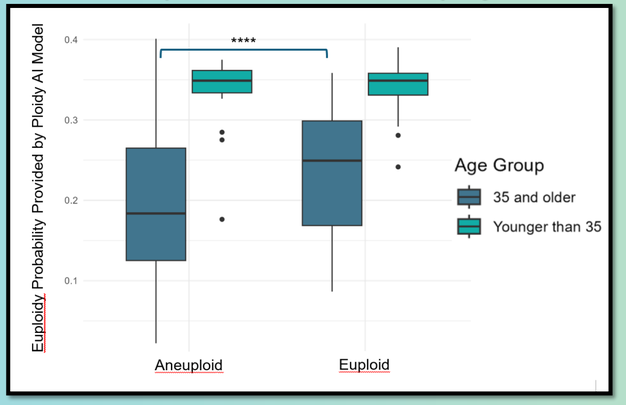
Images of 925 mature oocytes (153 patients, 30-48 years old) undergoing IVF-ICSI at a Spanish clinic using GERI time-lapse incubators were retrospectively analyzed by the Ploidy AI model to predict the probability (0-100%) of each oocyte developing into a euploid blastocyst. Within the dataset, 418 oocytes did not develop into a blastocyst, whereas 507 oocytes developed into a blastocyst (235 aneuploid, 149 euploid, 26 mosaics, 97 untested). Mosaic and untested blastocysts were excluded.

Results

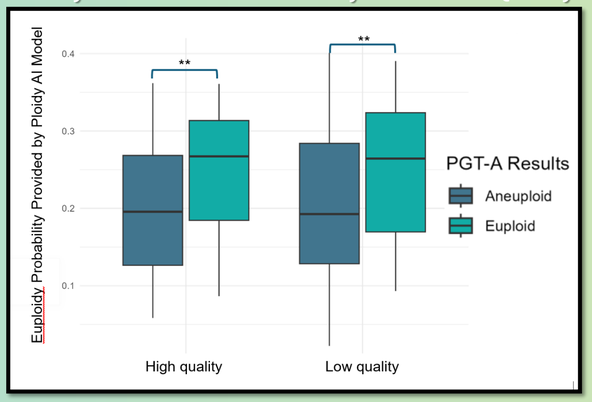
Ploidy AI Model Prediction vs True PGT-A



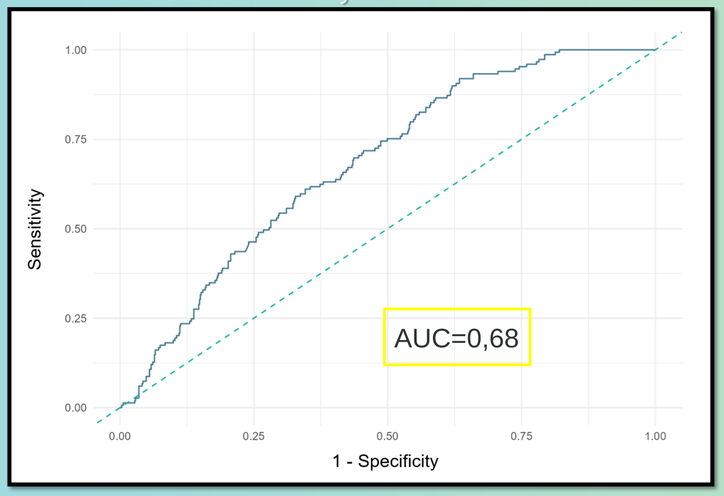
Ploidy AI Model Prediction by Age



Ploidy AI Model Prediction by Blastocist Quality



ROC Curve for Ploidy AI Model Performance



Conclusion

The novel AI Ploidy model predicts the ploidy status (euploid/aneuploid) of blastocysts from the oocyte stage. The model's predictions align with true PGT-A outcomes, even among older patients and different-quality blastocysts, providing a versatile, non-invasive, cost-effective method to assess blastocyst genetic potential from the earliest stage possible–the oocyte.

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