NOVEL ARTIFICIAL INTELLIGENCE OOCYTE ASSESSMENT TOOL REVEALS CORRELATION WITH BLASTOCYST DEVELOPMENTAL RATE, PLOIDY STATUS, and QUALITY

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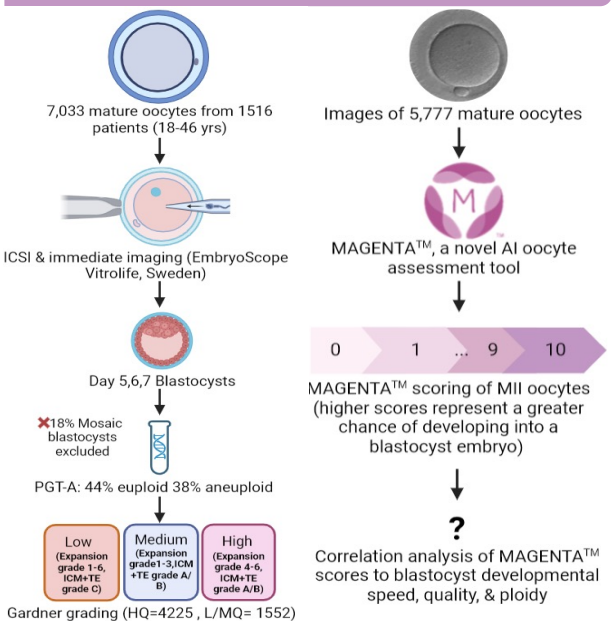
INTRODUCTION

- The developmental rate, quality, and ploidy status of blastocysts contribute to IVF cycle success.
- Day 5 (D5) blastocysts yield superior pregnancy outcomes than D6/7.

RESEARCH QUESTION

Can MAGENTA, a non-invasive AI oocyte assessment tool, identify MII oocytes more likely to develop into D5 blastocysts by assessing oocyte images, thus providing insights on the role of oocytes in the rate of blastocyst development?

METHODS



RESULTS

Fig 1 MAGENTA Score Distribution by Blastocyst Development Day

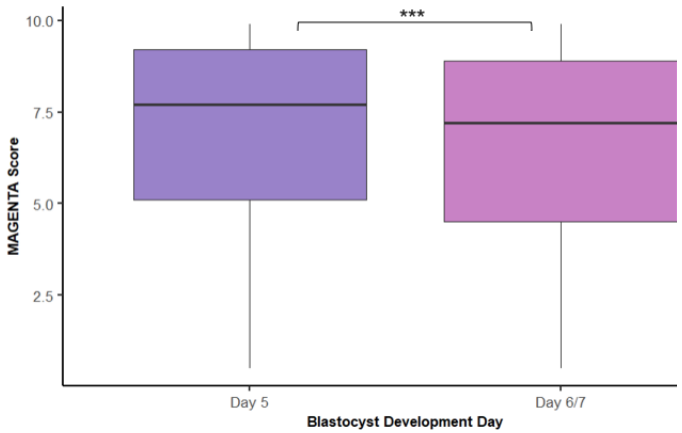


Fig 2 MAGENTA Score Distribution by Blastocyst Development Day and Ploidy Status

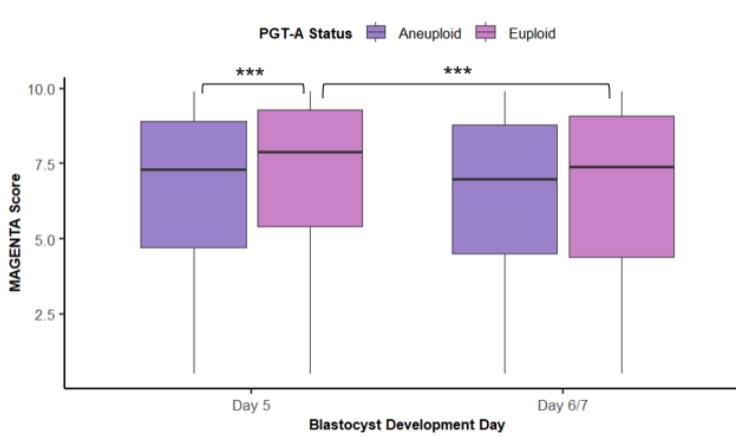


Fig 3 MAGENTA Score Distribution by Blastocyst Development Day and Blastocyst Quality

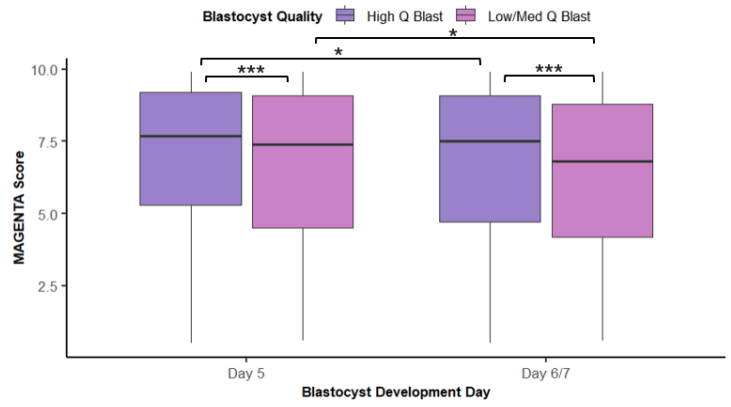
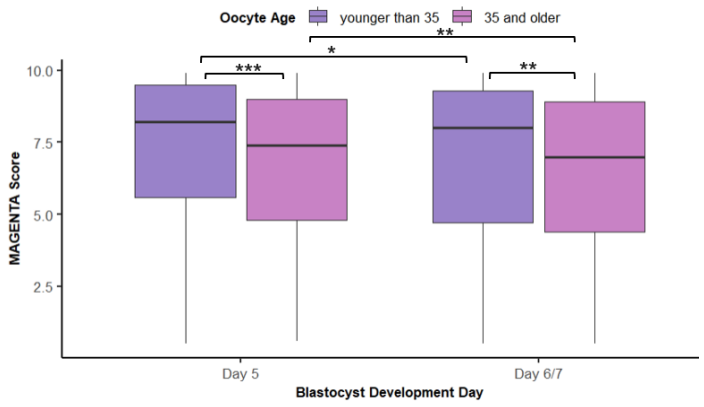


Fig 4 MAGENTA Score Distribution by Blastocyst Development Day and Oocyte Age



Mean MAGENTA scores for oocytes that developed into D5 blastocysts (faster developmental rate) were significantly higher than D6/7 (6.9 vs. 6.6,p<0.001) (**Fig 1**). MAGENTA scores were significantly higher for euploid blastocysts than aneuploid blastocysts in the D5 group (7.1 vs. 6.6,p<0.001). Scores were also significantly higher for oocytes that developed into D5 euploid blastocysts than D6/7 euploid blastocysts (7.1 vs. 6.7, p<0.001) (**Fig 2**). A similar pattern was observed with Gardner grading for blastocyst quality. High quality blastocysts demonstrated significantly higher oocyte MAGENTA scores than low/medium quality blastocysts (D5: 7 vs. 6.7,p<0.001; D6/7: 6.8 vs. 6.3,p<0.001), with both HQ and L/MQ D5 blastocysts having significantly higher MAGENTA scores than HQ and L/MQ D6/7 blastocysts (HQ D5 vs D6/7: 7 vs. 6.8,p<0.05; L/MQ D5 vs D6/7: 6.7 vs. 6.3,p<0.05) (**Fig 3**). Subgroup analysis to determine the correlation of MAGENTA scores with Day of blastocyst development between age groups revealed significantly higher scores in patients <35 compared to those ≥35, as expected (D5 <35 vs ≥35: 7.3 vs. 6.8,p<0.001; D6/7 <35 vs ≥35: 6.9 vs. 6.5,p<0.01). Oocytes that developed into D5 blastocysts had significantly higher MAGENTA scores than D6/7 blastocysts for patients <35 (7.3 vs. 6.9,p<0.05) and ≥35 (6.8 vs. 6.5,p<0.01) (**Fig 4**).

IMPLICATIONS

Higher MAGENTA scores significantly correlate with higher blastocyst developmental speed, euploidy, and HQ grading. It discerns oocytes with the highest developmental potential at the earliest possible stage, even in patients <35 with presumably superior oocytes.