

SCHEDA RELAZIONE DOTTORANDI

XXXVIII Ciclo

Al Collegio dei Docenti
Dottorato in Medicina Molecolare

Al coordinatore Prof. Vincenzo Sorrentino
cc. Pierpaolo Sartini

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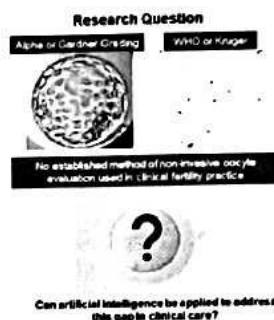
Attività scientifica svolta nel 2° anno di Dottorato

Anno Accademico 2023/2024

INTRODUCTION

AI is suited to analyze large datasets and is ever more present in IVF laboratories. Until last year, all studies were directed at embryo selection level, but recently the focus has shifted to the oocyte level.

Currently only one study, is available for embryologists and clinicians to counsel patients about their chance to obtain blastocyst stage embryos from oocytes before insemination. This study used an artificial intelligence model based on deep learning algorithm that correlate an image of an MII oocyte with sperm condition.



METHODS

The deep learning model showed a favorable performance for the evaluation of oocytes in terms of competence to develop into a blastocyst, and when the predictions were converted into scores, they correlated with blastocyst quality. This represents a significant first step in oocyte evaluation for scientific and clinical applications. However, has a limit due that the choice is not justified. So, we decide to use for the first time SHAP (Shapley Additive explanation) that explain the output of any machine learning model, and will tell us not only which oocytes are most performant, but also why. We are in the set-up and testing phase, due to the large number that these studies require.

RESULT

During my second year of study, I was able to assess the limitation of the Magenta AI that does not include in the algorithm an important element in the development of high-performance embryos, which is the male component. In addition, I found that sometimes it is not easy to follow the AI's indications in laboratory choices. Considering these assumptions, we decide to use SHAP, because understanding the reason for a machine's choice makes it more acceptable for embryologists that must make these choices every day.



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DIPARTIMENTO DI MEDICINA MOLECOLARE
E DELLO SVILUPPO

Partecipazione a Congressi / Abstract

1. Relatrice di 4 interventi al Convegno con Crediti ECM "La tutela della fertilità nel XXI secolo", 09 ottobre 2024, Campobasso. Nel medesimo Convegno e' stata anche co-Direttrice scientifica e membro del Board Scientifico
2. Partecipa al 40th Annual Meeting ESHRE, 07-10 luglio 2024, Amsterdam
3. Relatrice al Convegno Baby Fertilità, 05 Maggio 2024, Napoli

Pubblicazioni

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Docenza

1. Docente al Master di II livello in Biotecnologie Mediche e Biologia della Riproduzione Umana, Università degli Studi di Siena, aa 2023/2024
2. Cultrice della materia nel C.d.L. Magistrale in lingua inglese in Biotechnologies of Human Reproduction aa 2023/2024