Artificial intelligence in human in vitro fertilization

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Abstract

Infertility rates and the number of couples seeking fertility care have increased worldwide over the past few decades. Over 2.5 million cycles of assisted reproductive technologies are being performed globally every year, but the success rate has remained low. Machine learning, an automated method of data analysis based on patterns and inference, is increasingly being deployed within the health-care sector to improve diagnostics and therapeutics. This technique is already aiding embryo selection in some fertility clinics and research laboratories to improve IVF outcomes. It aims to choose the "best" embryos from the larger cohort of fertilized oocytes, the majority of which will be determined to be not viable either as a result of abnormal development or due to chromosomal imbalances. Enhancing embryo evaluation and selection, as well as increasing live birth rates, will require the adoption of novel technologies. As AI has the capability to analyze "big" data, the ultimate goal will be to apply AI tools to the analysis of all embryological, clinical, and genetic data in an effort to provide patient-tailored treatments. We report here an overview of existing AI technologies in reproductive medicine and envision their potential future applications in the field.

Keywords: Artificial intelligence; embryo selection; machine learning