AIVF™

The Power of AI in the IVF Lab.

Objective insights for consistency and certainty.

Embryo grading is a tool that helps the team determine which embryo to transfer, freeze or discard during a patient's IVF cycle. With the adoption of advanced artificial intelligence technologies in the fertility clinic, embryo evaluation is experiencing a digital transformation.

Embryo Grading Today

Manual embryo grading is done by removing the embryo from the incubator, looking at it through a microscope and taking a single, static snapshot of the development. Alternatively, using a time-lapse system, the embryologist views a video generated automatically from images captured at specific time intervals (depending on the system, every 10-20 minutes). The use of a time-lapse system provides continuous observation of the entire development of the embryo.

To grade the embryo's quality, clinics often adapt one of the standard embryo classification systems, such as Gardner. The grade is made up of a number, which represents the expansion of the embryo cavity, a letter, which represents the quality of the inner cell mass (ICM) and a letter which represents the quality of the trophectoderm, the layer that is destined to become the placenta.

Embryo grading relies on the embryology teams' knowledge and experience. Since embryo grading is highly dependent on the individual performing the assessment, it is highly subjective. The level of experience and workload of the lab staff has been shown to result in variability both within the same clinic and across different clinics[1]. Furthermore, the complex grading system is not easily understood by patients, who want to know the quality of their embryo for transfer now and in the future.

AI-powered Embryo Evaluation

Artificial intelligence (AI) systems are being deployed in IVF clinics to reimagine embryo evaluation. The introduction of automation and standardization will reduce the subjectivity and variability of manual embryo evaluation to assist the embryologist with their workload. In addition, AI has the power to perform initial triage of embryos that are not viable, helping to reduce the need for freezing and storage.

EMA™ by AIVF is an Artificial intelligence (AI) software platform that employs a set of deep-learning algorithms to assess embryo quality and developmental competence.
The algorithm is based on a large and diverse database of hundreds of thousands of historical embryo images and health records in collaboration with leading fertility clinics across the US, Europe and Asia.

The robust AI model is trained on biological markers of the embryo known to influence embryo viability and quality and can identify morphological features that the human eye is not able to see.

Objective AIVF Score

EMA automatically calculates a continuous AIVF score, from 1 - 9.9, for every embryo inside the time-lapse system. The score is simple to understand and explain to patients.
The model was designed in a way so that it does not decide which embryo should be selected for transfer, but rather, evaluates all embryos according to their developmental competence. This is critical in eliminating any potential bias or observer variability.

When grading is performed by an embryologist, often an embryo is compared relative to the other embryos from the same patient. Research has demonstrated that embryologists may select the first acceptable embryo for transfer, ignoring potentially viable embryos that are physically located in subsequent wells[2].

AI-driven embryo evaluation is inherently objective, comparing embryos across all patients. As such, EMA has the potential to help support standardization by neutralizing the inherent bias and variability associated with manual embryo evaluation.

By scoring embryos on a continuous scale, EMA provides automated and objective information to augment the embryologists' decision-making. In clinical evaluation, EMA's scoring system robustly classified embryos by their morphology class and correlated with parameters known to reflect the quality of the embryo.

The AIVF score is intended to support and augment, but never substitute for, embryologist decision-making inside the IVF clinic. As such, it has the potential to significantly improve the embryologists' ability to assess embryo viability with objectivity and consistency, while providing an easy to comprehend numbering system for patients.

[1] Ifenatuoha et al. "Errors in IVF laboratories: risks assessments and mitigations", Middle East Fertility Society Journal [2023] 28:5

[2] Seidman et al. The bias is out of the bag: IVF culture dish well number influences embryo selection decision-making and implantation outcome. "Human Reproduction", Volume 37, Issue Supplement_1, July 202