ESHRE 2020 Virtual (5-8 July 2020)

Questions for the speakers

Session 38: Laboratory session - Time-lapse in 2020

How TLT is changing our understanding and research on embryo development? - Thomas Freour (France)

Q: Can TLT eventually replace the PGT with its inherent errors de to mosaicism?

A: No. Unfortunately, no morphokinetic marker, alone or in combination, is able to predict accurately embryo ploidy or mosaicism. Although some slight differences of kinetic pattern between aneuploid / mosaic / euploid have been evocated in some studies, the considerable overlap between these categories prevents from using TL as a relevant diagnosis tool up to now. Further research and combination with other non-invasive markers might help improving the clinical usefulness of TL.

Q: Is it possible to detect the monogenic disorder within embryo TLT?

A: No. Unfortunately, no morphokinetic marker, alone or in combination, is able to predict accurately embryo genetic status, whatever the monogenic disorder is.

Q: What is the theory behind the morula checkpoint? How are neighboring cells able to sense aneuploidy during compaction?

A: That is a very good question, which nobody can answer at the moment, as far as I know… Hypotheses can be raised concerning the potential role of molecules involved in junctions, cytoskeletal conformation, physical forces involved in cell shape and movement within morula etc… Please refer to the exciting work of N. Plachta and JL Maitre (among others), hoping for further groundbreaking science.

Q: Can TL predict mosaicism? In which case PGT-A may still hold more value?

A: No. Unfortunately, no morphokinetic marker, alone or in combination, is able to predict accurately embryo ploidy or mosaicism. Although some slight differences of kinetic pattern between aneuploid / mosaic / euploid have been evocated in some studies, the considerable overlap between these categories prevents from using TL as a relevant diagnosis tool up to now. Further research and combination with other non-invasive markers might help improving the clinical usefulness of TL.

Q: Are there any studies coupling other embryo selection techniques [i.e. 'omics'] with TL to add more biochemistry / cell biology to morphometric analysis?

A: Yes, some studies have evaluated the relevance of combining TL with other non-invasive approaches. A good example (among many others) lies within the work of Dominguez and colleagues (Fertil Steril 2015), where the concentration of 7 proteins known to participate in embryo

development / metabolism was measured in embryo culture medium (in a TL system). Statistical analysis showed that one of these proteins (namely IL6) and some specific morphokinetic parameters could be associated in a hierarchical model in order to improve the prediction of embryo implantation potential. Although this kind of preliminary work deserves further validation and should be interpreted with care, it seems obvious that the combination of TL with other omics holds promises for the future.

Q: Could TLT incorporate therapeutic tools in the future - such as single gene therapy?

A: That is an interesting question. As TL allows precise embryo staging and monitoring, it could be relevant to integrate it in further innovative approaches. Besides clinical care, it is actually obvious that TL provides a relevant readout for research purpose on embryo development.

Q: Will TL be able to replace PGT-A in the future?

A: Let's see what future holds, but most probably no. Although TL might help increasing the chance of selecting euploid embryos for transfer or freezing, it is unlikely that any morphokinetic parameter, alone or in combination, could allow establishing accurately embryo ploidy status.