Optical coherence microscopy as a novel tool for quality assessment of mammalian oocytes and embryos - Anna Ajduk (Poland)

Q: For how long time was the Morula stages embryos exposed to/for OCM?
A: A single 3D OCM measurement took about 1 minute.

Q: Given that OCM illuminates with long wavelength light, will it increase cell temperature?
A: It is theoretically possible, however oocytes/embryos are exposed to OCM for a short time (approx. 1 minute), so it is unlikely that the effect is severe. Also, our experiments clearly indicate that OCM scan does not negatively affects quality of oocytes or embryos – they mature (oocytes) or develop to the blastocyst stage (embryos) the same as controls. We are in the process of testing whether OCM scan affects or not the postimplantation embryo development.

Follicular fluid levels of IL-10 are associated with oocyte fertilization and early embryo development. - Lucia Hartigan (Ireland)

Q: Do you think IL-10 levels in natural cycle or semi-managed cycles are comparable?
A: While we did not determine any differences in mean follicular fluid IL-10 levels between recombinant FSH or human menopausal gonadotrophin stimulated cycles, we cannot say with certainty that these levels would be similarly reflected in natural or semi-managed cycles. This is certainly something we are interested in following up.

Q: Cytokines are known to be influenced by gonadotrophins. All patients received the same stimulation?
A: Patients either received a standard GNRH agonist (Buserelin/ Suprecur®/ Deceapeptyl®) regime or a standard antagonist regime (Orgalutran®). Stimulation with recombinant FSH (Gonal F®/Puregon®) or human menopausal gonadotrophin (Menopur®) was initiated once down-regulation was confirmed via transvaginal ultrasound and serum oestradiol (E2) measurements or on day 2 or 3 of the cycle for antagonist cycles. The once-daily dose of follicle-stimulating hormone used for ovarian stimulation ranged from 125 IU to 450 IU. The regimen and dose of follicle-stimulating hormone was determined by the attending clinician on the basis of the patient’s age, ovarian reserve markers, and, when applicable, previous response to ART cycles. We did not find a significant difference in mean follicular fluid IL10 levels when stratified between Gonal-F, Puregon or Menopur stimulation regimens.

Q: How did you deal with eventual blood contamination?
A: The follicular fluid samples were obtained from only the first follicle drained during oocyte retrieval. To minimise the collection of blood, a midstream aspirate was collected for each patient. The corresponding oocyte was then tracked to establish whether or not it fertilized and if it did, whether or not the embryo successfully reached blastocyst stage.

Q: IL10 is anti-inflammatory cytokine and previous larger study showed no association w/ outcomes. Thoughts?

A: IL-10 is a Th2 cytokine is involved in immune tolerance and the resolution of inflammation which is critical throughout pregnancy. Generally it has been suggested that inappropriate expression of pro-inflammatory Th1 cytokines promote allograft rejection and may be detrimental to the establishment of pregnancy, while Th2 cytokines are necessary to stimulate blastocyst invasion and blood vessel formation during the implantation period and promote allograft tolerance thereby potentially increasing likelihood of fetal survival. A recent animal study reported that a Th2 response in peripheral blood mononuclear cells (PMNC) during early pregnancy is important for successful bovine pregnancy. (Ling Yang et al, 2016) Furthermore, Marzi et al demonstrated that the normal pregnancy was correlated with an increase in serum IL-4 and IL-10. (Marzi et al, 1996)

Interestingly in our study, however, IL-10, with its Th2 anti-inflammatory properties, was increased in the follicular fluid of oocytes with poorer developmental competence. Like other authors, we refute a simplistic model where Th1 cytokines are ‘bad’ and Th2 cytokines are ‘good’ with regard to fertilization and successful pregnancy outcomes. (Alhilali et al 2019) Indeed, parallels between inflammation and ovulation have long been recognized (Espey 1980) and inflammatory mediators are important for functional and structural changes associated with follicle growth and oocyte maturation. (Duffy et al 2019) Given the intimate contact and bidirectional signaling between follicular fluid and its associated oocyte, it is possible that high levels of IL-10 reflect a dysregulated inflammatory milieu within the growing follicle that impairs oocyte maturation and developmental potential.