**ESHRE Abstract 2018**

Title : The human fallopian tube vs endometrium: can functional and steroid hormone receptor expression differences be explained by differential hormone responsiveness.

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Study question:

Are there spatial and temporal differences in cellular proliferation and steroid hormone receptor expression in the human fallopian tube (FT), as there are in the endometrium?

Summary answer:

The premenopausal FT does not display cyclical changes in cellular proliferation, but demonstrates a similar steroid hormone receptor expression pattern to the quiescent postmenopausal endometrium.

What is known already:

The human FT epithelium exists as a continuum of the endometrium. Both tissues share the same embryological origin. The endometrium is widely accepted as the main target organ for the ovarian steroid hormones, and undergoes a well-described monthly cycle of proliferation, differentiation, shedding, and regeneration throughout a woman’s reproductive life. Hormonal regulation is exerted through the cognate ovarian steroid hormone receptors (ERa, ERb, PR, and AR), which are expressed in endometrial cells. Although the steroid hormone dependent cyclical changes are well described in the endometrium, the effect of the same hormones on the FT epithelium has not been comprehensively studied.

Study design, size, duration:

A prospective observational study, analysing matched full thickness human endometrial and FT samples, from 38 healthy women undergoing hysterectomy for benign conditions, including 28 samples from premenopausal women, and 10 from postmenopausal women. Full thickness samples were obtained to allow investigation of the three compartments of the endometrium: the luminal epithelium, the functionalis, and the basalis. The FT samples were taken from both the isthmic and the fimbrial areas.

Participants/materials, setting, methods:

Matched endometrium and FT samples were analysed by immunohistochemistry (IHC), for proliferative marker Ki-67, and steroid hormone receptors AR and PR (n = 38). Gene expression of AR and PR was examined by qPCR in matched endometrial and FT samples (n = 5). Primary human endometrial and FT epithelial cells were treated with oestradiol (E2) and androgens (DHT) in short term cultures, and the expression of Ki-67, AR, and PR analysed by IHC and qPCR (n = 7).

Main results and the role of chance:

The FT displayed weaker expression of proliferative marker Ki-67 than the endometrium throughout the menstrual cycle in all compartments, whereas the premenopausal endometrium was highly proliferative, particularly the functionalis. (P<0.005).

Interestingly, the tubal epithelium displayed similar pattern of AR expression as the postmenopausal endometrium. A significant difference was found in AR expression between the tubal epithelium and the matched premenopausal functionalis epithelial cell (P<0.05). PR expression in the FT and endometrium was not significantly different.

As both AR and PR are postulated to be regulated by oestrogen in the endometrium, the matched FT and endometrial cell cultures with E2 and DHT in vitro, to explore the steroid hormone receptor response to ovarian hormones. E2 treatment in the endometrium caused down regulation of PR mRNA, whereas in the FT, E2 treatment slightly increased PR mRNA expression. Androgens do not have a defined effect on PR in the endometrium or FT, however in this study we observed down regulation of tubal PR mRNA expression, and upregulation of AR mRNA expression, after treatment with DHT. This suggests that the tubal epithelium has a different response to oestrogen than the endometrium, and is more sensitive to androgens.

Limitations, reasons for caution:

This is a descriptive study with short-term culture of primary human endometrial and tubal epithelial cells in vitro, with a small sample size of matched human endometrium and defined portions of the FT samples.

Wider implications of the findings:

The FT does not undergo cyclical proliferation, and shares similarities in steroid hormone receptor expression with the postmenopausal endometrium. These findings contribute towards understanding the physiology of the FT. Further research in this area will enable research into disorders of the FT, such as ectopic pregnancy, infertility, and FT/ovarian epithelial cancers.

Study funding/competing interests:

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Trial registration number: N/A