THE ENDOMETRIUM OF FARM ANIMALS AS A SOURCE OF MESENCHYMAL PROGENITOR/STEM CELLS: IMPLICATIONS FOR THE TREATMENT OF REPRODUCTIVE DISEASES AND FOR TRANSLATIONAL APPLICATIONS TO HUMANS

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Background: The uterine endometrium is a dynamic changing tissue that proliferates, differentiates and sheds on a cyclic basis and it is central to implantation in mammals. Mesenchymal stem cells (MSCs) have been identified in the endometrium of humans, mice and pigs. However scarce information is available for same cells in ruminants or horses. We hypothesized that the endometrium of these animals harbors MSCs, which can be isolated and used for regenerative studies. **Goal:** Our research is aimed to demonstrate the presence of MSCs in the endometrium of cycling cows and mares throughout the estrus cycle and during different uterine pathologies such as endometritis and endometrosis, and to compare their main biological attributes with cells derived from other "conventional" tissues such as subcutaneous fat. **Methods**: Cattle: biopsies were taken from the endometrium of cows in the follicular, early or luteal phases of the oestrus, as well as from cattle with chronic or acute endometritis according to the criteria of Sheldon et al., 2008. Mares: Uterine endometrial biopsies were taken from fertile mares during the breeding season as well as from barren mares which failed to get pregnant for two years in a row. Independently of the tissue origin, all samples were subjected to cell disaggregation and expansion, and were searched for the presence of embryonic and mesenchymal markers of stemness both at the mRNA or protein levels, differentiative tri-potency to mesenchymal derivatives, and other cellular attributes of MSCs, such as migration and exosome secretion. To assess our goals, a combination of molecular, cellular and immunological tools was used, including RT-qPCR, induced differentiation and specific staining for each differentiated lineage, immune staining, *in situ* hybridization, exosome isolation and characterization, western blot and microarray analysis linked to bioinformatics. **Results**: In short, we identified, isolated and characterized MSCs from the endometrium of ruminants and horses in spite of the physiological and/or pathological conditions. Detailed results will be discussed. **Conclusions**: There are MSCs in the uterine tract of farm animals. The implications of these findings for future regenerative therapies in these and other animal models is of great importance.
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