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New approaches to endometriosis treatment -- mouse experiments point the way

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Possible new directions for the treatment of endometriosis, a painful condition associated with infertility that affects up to 15% of women of reproductive age, will be outlined in the presentation of two experimental studies at the 23rd annual conference of the European Society of Human Reproduction and Embryology.

Both concern targeting angiogenesis – the formation of new blood vessels – which is encourages endometriosis by providing a rich blood supply.

Dr. Edurne Novella-Maestre and colleagues from the Valencia Infertility Institute (IVI), Spain, studied Vascular Endometrial Growth Factor (VEGF), which is known to be particularly involved in the angiogenesis process and therefore in the development of endometriosis. They created an experimental model of endometriosis in nude mice in order to test whether dopamine agonists, much used in other infertility treatment such as the prevention of ovarian hyper-stimulation syndrome, could be a new strategy for inhibiting endometrial lesions. “We know that dopamine agonists are a safe treatment, and that they have been used for many years in order to stop breastfeeding, for example, without any major side effects”, says Dr. Novella-Maestre, “so we decided to see what effect they would have on the experimental mice.”

The scientists found that the blood vessel formation in the lesions was significantly decreased. “The percentage of new blood vessels in the two treatment groups was reduced in comparison to the control group, and

we also found that the percentage of old blood vessels in these groups were higher", says Dr. Novella-Maestre. "The total number of the blood vessels was not dissimilar in the treatment and control groups, but the ratio of new/old blood vessels, the numbers of cells growing in the endometrial area, and the area lesions were totally different, suggesting that there was inhibition of blood vessel replacement in the treatment group."

The team now intends to follow up the work in humans. "Our initial experiments have confirmed the presence of the dopamine receptor in human endometriosis, and therefore we believe that treatment with dopamine agonists will have the same effect on humans as it does on mice", she says. "This is encouraging, since current therapies are still associated with a high recurrence rate, and many of them can only be used for a limited time due to unacceptable side effects and/or osteoporosis. For women with pain, surgery can provide a temporary relief, although symptoms recur in up to 75% of women within two years. A long-term, safe, and non-invasive solution is badly needed."

An additional advantage of such a treatment, say the scientists, is that it is likely that women with endometriosis also have an increased risk of various cancers. The simultaneous occurrence of endometriosis with ovarian cancer, for example, suggests that endometriosis constituents may transfer into tumour cells. "If we are able to inhibit angiogenesis in the ectopic human endometrium with a dopamine agonist", says Dr. Novella-Maestre, "we may be able to decrease the cancer risk for these patients."

In another presentation to the conference, Dr. Ofer Fainaru, from Harvard Medical School and Children's Hospital Boston, in Boston, Mass., USA, will announce that his team has found that dendritic cells – highly specialised immune cells – support angiogenesis by enhancing blood vessel growth. Using a mouse model of endometriosis, they found

that these cells incorporate into the endometriosis lesions and enhance their growth. “We also found that these cells have a similar effect on intra-abdominal tumours”, he said.

“We therefore believe that targeting dendritic cells may prove to be a promising strategy for treating conditions dependent on angiogenesis, such as endometriosis and cancer,” says Dr. Fainaru. “Our next step will be to look for specific dendritic cell inhibitors that could have the potential to decrease angiogenesis in these conditions.”

The team hopes that in the future it may be able to develop cell-specific therapy for angiogenesis-dependent diseases that will be more effective and less toxic than current treatments.

Source: European Society for Human Reproduction and Embryology