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Title: Of mice and women: a laparoscopic mouse model for endometriosis

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Conflicts of interest:

No relevant conflicts of interest are reported by DP, MB, DO, AV, AF, and JV in the subject matter or materials discussed in this manuscript.

Prof. D'Hooghe reports grants from Ferring, Merck Serono, personal fees from Astellas, Actavis, Bayer, Roche Diagnostics, Cartagenia, outside the submitted work. Since October 1st 2015, he has been appointed as Vice-President and Head, Global Medical Affairs Fertility with Merck, Darmstadt, Germany. The work published here was done entirely before that appointment, and was performed under his supervision in his role as Clinical and Academic Head, Division of Reproductive Medicine, Leuven University Hospitals. Since October 2015, he has continued to serve as Professor in Reproductive Medicine at KU Leuven (University of Leuven).

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Statement of prior presentation:

This video was presented at the conference of the American Society of Reproductive Medicine (ASRM), held at Salt Lake City, UT, October 15-19, 2016 and was awarded with the “First prize for technical achievement in video”.

Ethical approval:

All animal experiments were approved by the Ethical committee of KU Leuven, Belgium (ethical approval number: P031/2013).

Word count:

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Decidualization; Estrogen; Endometrium; Menstruation; Progesterone

Abstract

Objective: To demonstrate how a novel laparoscopic approach allows the development of a mouse model for endometriosis after seeding menstrual endometrium from donor mice into the abdominal cavity of syngeneic recipient mice.

Design: A step-by-step video description of the techniques used to adapt the estrous cycle of mice towards a menstrual cycle and to subsequently induce endometriosis via laparoscopic seeding of menstrual endometrium.

Setting: University research institute

Ethics: All experiments were ethically approved by KU Leuven, Belgium (ethical approval number: P031/2013).

Intervention(s): Oophorectomized female C57BL/6JRj mice received a series of estrogen injections. Next, a progesterone pellet was administered, together with a second series of estrogen injections. In addition, decidualization of the endometrium was induced with an intra-uterine sesame oil stimulus. Four days later, the progesterone pellet was removed and menstruation started [1].

Five hours after progesterone pellet removal, the uterus was harvested, menstrual endometrium dissected and seeded into the abdominal cavity of syngeneic recipient mice to induce endometriosis [2] using a laparoscopic approach [3]. Uterus and lesions were removed from the recipient mice one week after induction, and tissues were immunohistochemically stained for H&E, vimentin, and cytokeratin.

Conclusion: In this video, we have demonstrated a novel methodology to induce endometriosis in mice using laparoscopic inoculation of syngeneic menstrual endometrium, mimicking Sampson's theory of retrograde menstruation [4]. Compared to currently available rodent models, our model offers a less invasive and more physiological way for fundamental and preclinical endometriosis research, with a high endometriosis incidence and lesion take rate.

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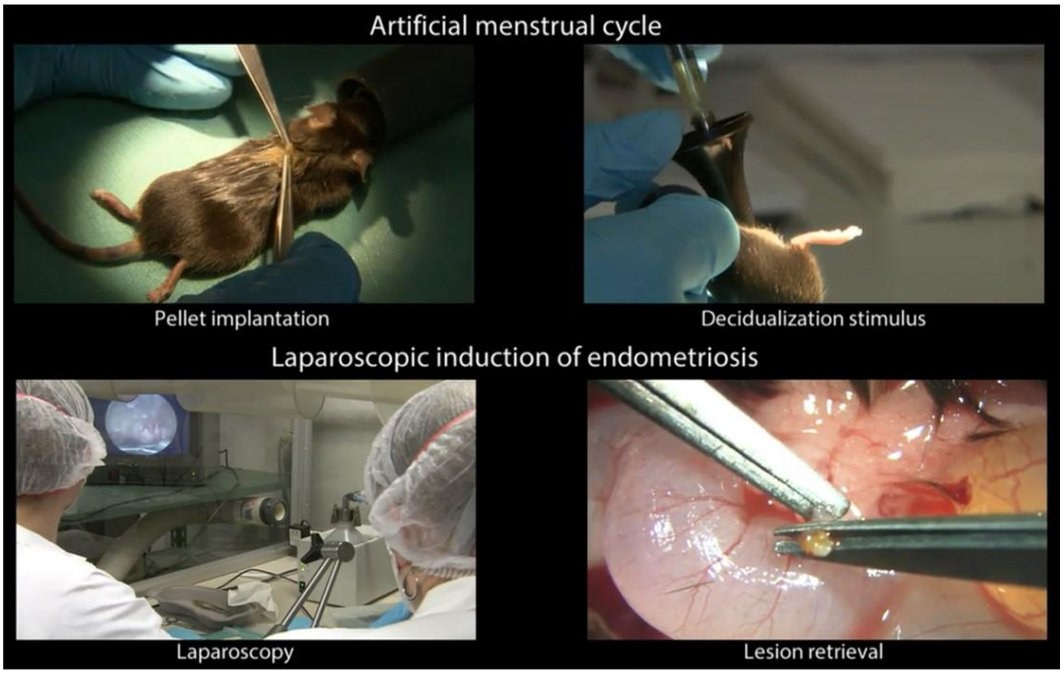

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