



Introduction

This research models a woman in order to determine which chemicals are most significant to the survival of ectopic endometrial cells.

Model

The model and simulation were implemented in MATLAB R2012a and Java 1.6.



The model lives in the pelvic cavity



How the model works

Why doesn't every woman of reproductive age have endometriosis? Grant C. Rettke, Dr. Stephen J. Merrill, Ph.D.

Marquette University, Program in Computational Sciences

Simulation



A configuration of a woman add estradiol execute model implementation add androstenedione For every cell: add ectopic endometrial cells clear hormones

How the simulation works

Variables

- androstenedioneSearchLowerCutoff: How likely is a cell to find it?
- *ectopicEndometrialCellToAddAtMonthEnd*: How many cells are released every month via retrograde menstruation?
- *estradiolSearchLowerCutoff*: How likely is a cell to find it?
- *sf1ToCouptfBindingLowerCutoff*: Is the cell more likely to find the enabler or inhibitor?
- *yearsToRun*: Years are composed twelve months, each thirty days long

Results



No retrograde menstruation means no disease







Small cell escape can survive; but can't contribute estradiol



A system guaranteed to find and produce is always limited by adrostenedione.

Conclusions & Future Work



Execution of the simulation resulted in the observation that:

Future work that came out of this research:

References

- (Sep): 131-47.
- March 27, 2012).









With enough androstene and assured enabler hormone; the cell count will grow

Slow growth, then an explosion of survival and the cells become self-sufficient

• Regardless of the limits of hormones or the number of cells released every cycle, the likelihood of binding to the enabling hormone is the single most important event in success of the disease.

• The role of the enabler is recognized in the literature; but not quantified.

Future research: efficiency of estradiol production and sensitivity to estradiol and their impact on cell survival

[•] BULUN, SERDAR E., SIJUN YANG, ZHOJUAN FANG, BILGIN GURATES, MITSUTOSHI TAMURA, and SIBY SEBASTIAN. 2002. Estrogen production and metabolism in endometriosis. Annals of the New York Academy of Sciences 955 (1): 75-85. • Sharpe-Timms, K. L. 2001. Endometrial anomalies in women with endometriosis. Annals of the New York Academy of Sciences 943

[•] Wikipedia contributors, "Pelvic cavity," Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/wiki/Pelvic_cavity (accessed

[•] Zeitoun, K., K. Takayama, M. D. Michael, and S. E. Bulun. 1999. Stimulation of aromatase P450 promoter (II) activity in endometriosis and its inhibition in endometrium are regulated by competitive binding of steroidogenic factor-1 and chicken ovalbumin upstream promoter transcription factor to the same cis-acting element. Molecular Endocrinology (Baltimore, Md.) 13 (2) (Feb): 239-53.