



## Mary Polan

Katharine Dexter McCormick and Stanley McCormick Memorial Professor in the School of Medicine, Emerita  
Obstetrics & Gynecology

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### Bio

#### ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Obstetrics & Gynecology
- Member, Bio-X

#### ADMINISTRATIVE APPOINTMENTS

- Chair, Stanford University School of Medicine - Obstetrics & Gynecology, (1999- present)

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### Research & Scholarship

#### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Dr. Polan's research has centered around ovarian function during both the follicular and luteal phases. Studies of steroidogenesis, LH receptor synthesis, and the involvement of the plasminogen activator system in ovarian events have been performed. In addition, this laboratory has investigated the synthesis and secretion of interleukin-1 by human peripheral monocytes as well as by human granulosa-luteal cells isolated from IVF patients. More recently this laboratory has focused on the role of IL-1, IL-1ra, and IL-1 type 1 receptor, as well as collagenase and TIMPs, in the process of embryonic implantation. Studies with IL-1 receptor antagonist have documented its ability to prevent implantation in the mouse model.

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### Publications

#### PUBLICATIONS

- **Transforming growth interacting factor expression in leiomyoma compared with myometrium** *FERTILITY AND STERILITY*  
Yen-Ping, J., Man, W. C., Wen, Y., Polan, M. L., Ho, E. S., Chen, B.  
2010; 94 (3): 1078-1083
- **The role of counseling for obstetric fistula patients: Lessons learned from Eritrea** *PATIENT EDUCATION AND COUNSELING*  
Johnson, K. A., Turan, J. M., Hailemariam, L., Mengsteab, E., Jena, D., Polan, M. L.  
2010; 80 (2): 262-265
- **Is lysyl oxidase-like protein-1, alpha-1 antitrypsin, and neutrophil elastase site specific in pelvic organ prolapse?** *INTERNATIONAL UROGYNECOLOGY JOURNAL*  
Man, W. C., Ho, J. Y., Wen, Y., Sokol, E. R., Polan, M. L., Chen, B.  
2009; 20 (12): 1423-1429
- **Relaxin increases elastase activity and protease inhibitors in smooth muscle cells from the myometrium compared with cells from leiomyomas** *FERTILITY AND STERILITY*  
Chen, B., Wen, Y., Yu, X. Y., Polan, M. L.  
2009; 91 (4): 1351-1354

- **Effect of relaxin on TGF-beta 1 expression in cultured vaginal fibroblasts from women with stress urinary incontinence** *REPRODUCTIVE SCIENCES*  
Wen, Y., Zhao, Y., Polan, M. L., Chen, B.  
2008; 15 (3): 312-320
- **Is alpha 2-macroglobulin important in female stress urinary incontinence?** *HUMAN REPRODUCTION*  
Wen, Y., Man, W. C., Sokol, E. R., Polan, M. L., Chen, B. H.  
2008; 23 (2): 387-393
- **Expression of CD9 in frozen-thawed mouse oocytes: preliminary experience** *FERTILITY AND STERILITY*  
Wen, Y., Quintero, R., Chen, B., Shu, Y., Polan, M. L., Behr, B.  
2007; 88 (2): 526-529
- **Differences in mRNA and protein expression of small proteoglycans in vaginal wall tissue from women with and without stress urinary incontinence** *HUMAN REPRODUCTION*  
Wen, Y., Zhao, Y. Y., Li, S., Polan, M. L., Chen, B. H.  
2007; 22 (6): 1718-1724
- **Increased expression of latent TGF-beta binding protein-1 and fibrillin-1 in human uterine leiomyomata.** *Molecular human reproduction*  
Zhao, Y., Wen, Y., Polan, M. L., Qiao, J., Chen, B. H.  
2007; 13 (5): 343-349
- **Eritrean Women's Project response to wall paper: "Hard questions concerning fistula surgery in third world countries"** *JOURNAL OF WOMENS HEALTH*  
Husain, A., Polan, M. L., Morgan, M., Ghebrekidan, A.  
2007; 16 (2): 281-282
- **Experiences of women seeking medical care for obstetric fistula in Eritrea: implications for prevention, treatment, and social reintegration.** *Global public health*  
Turan, J. M., Johnson, K., Polan, M. L.  
2007; 2 (1): 64-77
- **The role of neutrophil elastase in elastin metabolism of pelvic tissues from women with stress urinary incontinence** *NEUROUROLOGY AND URODYNAMICS*  
Chen, B., Wen, Y., Yu, X., Polan, M. L.  
2007; 26 (2): 274-279
- **Do extracellular matrix protein expressions change with cyclic reproductive hormones in pelvic connective tissue from women with stress urinary incontinence?** *HUMAN REPRODUCTION*  
Wen, Y., Polan, M. L., Chen, B.  
2006; 21 (5): 1266-1273
- **Double-blind, placebo-controlled study of Fertilityblend: a nutritional supplement for improving fertility in women.** *Clinical and experimental obstetrics & gynecology*  
Westphal, L. M., Polan, M. L., Trant, A. S.  
2006; 33 (4): 205-208
- **Microarray analysis of differentially expressed genes in vaginal tissues from women with stress urinary incontinence compared with asymptomatic women** *HUMAN REPRODUCTION*  
Chen, B., Wen, Y., Zhang, Z. M., Guo, Y. Q., Warrington, J. A., Polan, M. L.  
2006; 21 (1): 22-29
- **Surgical management of complex obstetric fistula in Eritrea** *JOURNAL OF WOMENS HEALTH*  
Husain, A., Johnson, K., Glowacki, C. A., Osias, J., Wheelless, C. R., Asrat, K., Ghebrekidan, A., Polan, M. L.  
2005; 14 (9): 839-844
- **Elastin metabolism in pelvic tissues: Is it modulated by reproductive hormones?** *Joint Annual Meeting of the American-Urogynecologic-Society/Society-of-Gynecologic-Surgeons*  
Chen, B., Wen, Y., Yu, X. Y., Polan, M. L.  
MOSBY-ELSEVIER.2005: 1605-13

- **Preliminary experience with low concentration of granulocyte-macrophage colony-stimulating factor: A potential regulator in preimplantation mouse embryo development and apoptosis** *JOURNAL OF ASSISTED REPRODUCTION AND GENETICS*  
Behr, B., Mooney, S., Wen, Y., Pollan, M. L., Wang, H. B.  
2005; 22 (1): 25-32
- **Estrogen bioassay of ginseng extract and Arginmax((R)), a nutritional supplement for the enhancement of female sexual function** *JOURNAL OF WOMENS HEALTH*  
Polan, M. L., Hochberg, R. B., Trant, A. S., Wuh, H. C.  
2004; 13 (4): 427-430
- **A nutritional supplement for improving fertility in women - A pilot study** *JOURNAL OF REPRODUCTIVE MEDICINE*  
Westphal, L. M., Polan, M. L., Trant, A. S., Mooney, S. B.  
2004; 49 (4): 289-293
- **Career advancement for women faculty in a US school of medicine: Perceived needs** *ACADEMIC MEDICINE*  
McGuire, L. K., Bergen, M. R., Polan, M. L.  
2004; 79 (4): 319-325
- **Avoiding menstruation - A review of health and lifestyle issues** *JOURNAL OF REPRODUCTIVE MEDICINE*  
Henzl, M. R., Polan, M. L.  
2004; 49 (3): 162-174
- **Elastolytic activity in women with stress urinary incontinence and pelvic organ prolapse** *NEUROUROLOGY AND URODYNAMICS*  
Chen, B., Wen, Y., Polan, M. L.  
2004; 23 (2): 119-126
- **Female sexual arousal: a behavioral analysis** *FERTILITY AND STERILITY*  
Polan, M. L., Desmond, J. E., Banner, L. L., Pryor, M. R., McCallum, S. W., Atlas, S. W., Glover, G. H., Arnow, B. A.  
2003; 80 (6): 1480-1487
- **Matrix metalloproteinase and tissue inhibitor of matrix metal loproteinase expression in human preimplantation embryos** *FERTILITY AND STERILITY*  
Wang, H. B., Wen, Y., Mooney, S., Li, H., Behr, B., Polan, M. L.  
2003; 80: 736-742
- **Distinctive proliferative phase differences in gene expression in human myometrium and leiomyomata** *FERTILITY AND STERILITY*  
Wang, H. B., Mahadevappa, M., Yamamoto, K., Wen, Y., Chen, B., Warrington, J. A., Polan, M. L.  
2003; 80 (2): 266-276
- **Bench to bedside: clinical opportunities for microarray analysis** *FERTILITY AND STERILITY*  
Polan, M. L., Warrington, J. A., Chen, B., Mahadevappa, M., Wang, H. B., Wen, Y.  
2003; 80 (2): 291-292
- **Differences in estrogen modulation of tissue inhibitor of matrix metalloproteinase-1 and matrix metalloproteinase-1 expression in cultured fibroblasts from continent and incontinent women** *23rd Annual Meeting of the American-Urogynecologic-Society*  
Chen, B., Wen, Y., Wang, H., Polan, M. L.  
MOSBY-ELSEVIER.2003: 59-65
- **Menstrual phase-dependent gene expression differences in periurethral vaginal tissue from women with stress incontinence** *23rd Annual Meeting of the American-Urogynecologic-Society*  
Chen, B., Wen, Y., Zhang, Z. M., Wang, H. B., Warrington, J. A., Polan, M. L.  
MOSBY-ELSEVIER.2003: 89-97
- **A student-initiated interactive course as a model for teaching reproductive health** *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY*  
Meites, E., Wagner, J. L., Choy, M. K., Polan, M. L.  
2002; 187 (3): S30-S33
- **Follicle development in grafted mouse ovaries after cryopreservation and subcutaneous transplantation** *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY*  
Wang, H. B., Mooney, S., Wen, Y., Behr, B., Polan, M. L.

2002; 187 (2): 370-374

- **Phospholipase A(2) and cyclooxygenase gene expression in human preimplantation embryos** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Wang, H. B., Wen, Y., Mooney, S., Behr, B., Polan, M. L.  
2002; 87 (6): 2629-2634
- **Brain activation and sexual arousal in healthy, heterosexual males** *BRAIN*  
Arnow, B. A., Desmond, J. E., Banner, L. L., Glover, G. H., Solomon, A., Polan, M. L., Lue, T. F., Atlas, S. W.  
2002; 125: 1014-1023
- **Collagen metabolism and turnover in women with stress urinary incontinence and pelvic prolapse** *INTERNATIONAL UROGYNECOLOGY JOURNAL*  
Chen, B. H., Wen, Y., Li, H., Polan, M. L.  
2002; 13 (2): 80-87
- **Interleukin (IL)-1 beta regulation of IL-1 beta and IL-1 receptor antagonist expression in cultured human endometrial stromal cells** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Huang, H. Y., Wen, Y., Kruessel, J. S., Raga, F., Soong, Y. K., Polan, M. L.  
2001; 86 (3): 1387-1393
- **Interleukin-1 beta regulates urokinase plasminogen activator (u-PA), u-PA receptor, soluble u-PA receptor, and plasminogen activator inhibitor-1 messenger ribonucleic acid expression in cultured human endometrial stromal cells** *46th Annual Meeting of the Society-for-Gynecologic-Investigation*  
Chung, H. W., Wen, Y., Ahn, J. J., Moon, H. S., Polan, M. L.  
ENDOCRINE SOC.2001: 1332-40
- **Expression of vascular endothelial growth factor mRNA in human preimplantation embryos derived from tripronuclear zygotes** *15th Annual Conference of the European-Society-of-Human-Reproduction-and-Embryology*  
Krussel, J. S., Behr, B., Hirchenhain, J., Wen, Y., Milki, A. A., Cupisti, S., Bielfeld, P., Polan, M. L.  
ELSEVIER SCIENCE INC.2000: 1220-26
- **Is there a place for biochemical embryonic preimplantational screening?** *Ares-Serono Workshop on Human Implantation - Recent Advances & Clinical Aspects*  
Krussel, J. S., Huang, H. Y., Hirchenhain, J., Bielfeld, P., Cupisti, S., Jeremias, L., Polan, M. L.  
SOC REPRODUCTION FERTILITY.2000: 147-159
- **The role of gonadotropin-releasing hormone in murine preimplantation embryonic development** *ENDOCRINOLOGY*  
Raga, F., Casan, E. M., Kruessel, J., Wen, Y., Bonilla-Musoles, F., Polan, M. L.  
1999; 140 (8): 3705-3712
- **GnRH mRNA and protein expression in human preimplantation embryos** *14th Annual Meeting of the ESHRE*  
Casan, E. M., Raga, F., Polan, M. L.  
OXFORD UNIV PRESS.1999: 234-39
- **Independent regulation of matrix metalloproteinase-9, tissue inhibitor of metalloproteinase-1 (TIMP-1), and TIMP-3 in human endometrial stromal cells by gonadotropin-releasing hormone: Implications in early human implantation** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Raga, F., Casan, E. M., Wen, Y., Huang, H. Y., Bonilla-Musoles, F., Polan, M. L.  
1999; 84 (2): 636-642
- **Quantitative gonadotropin-releasing hormone gene expression and immunohistochemical localization in human endometrium throughout the menstrual cycle** *45th Annual Meeting of the Society-for-Gynecologic-Investigation*  
Raga, F., Casan, E. M., Kruessel, J. S., Wen, Y., Huang, H. Y., Nezhat, C., Polan, M. L.  
SOC STUDY REPRODUCTION.1998: 661-69
- **Expression of interleukin-1 system mRNA in single blastomeres from human preimplantation embryos** *HUMAN REPRODUCTION*  
Krussel, J. S., Simon, C., Rubio, M. C., Pape, A. R., Wen, Y., Huang, H. Y., Bielfeld, P., Polan, M. L.  
1998; 13 (8): 2206-2211
- **Immunoreactive gonadotropin-releasing hormone expression in cycling human endometrium of fertile patients** *45th Annual Meeting of the Society-for-Gynecologic-Investigation*

- Casan, E. M., Raga, F., Kruessel, J. S., Wen, Y., Nezhad, C., Polan, M. L.  
ELSEVIER SCIENCE INC.1998: 102–6
- **Cytokine-mediated regulation of 92-kilodalton type IV collagenase, tissue inhibitor of metalloproteinase-1 (TIMP-1), and TIMP-3 messenger ribonucleic acid expression in human endometrial stromal cells** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Huang, H. Y., Wen, Y., Irwin, J. C., Kruessel, J. S., Soong, Y. K., Polan, M. L.  
1998; 83 (5): 1721-1729
  - **Single blastomeres within human preimplantation embryos express different amounts of messenger ribonucleic acid for beta-actin and interleukin-1 receptor type I** *13th Annual Meeting of the European-Society-of-Human-Reproduction-and-Embryology*  
Krussel, J. S., Huang, H. Y., Simon, C., Behr, B., Pape, A. R., Wen, Y., Bielfeld, P., Polan, M. L.  
ENDOCRINE SOC.1998: 953–59
  - **Interleukin-1 beta regulates vero cell interleukin-1 receptor type I messenger ribonucleic acid expression** *BIOLOGY OF REPRODUCTION*  
Huang, H. Y., Wen, Y., Valbuena, D., Krussel, J. S., Polan, M. L.  
1997; 57 (4): 783-790
  - **Different pattern of interleukin-1 beta-(IL-1 beta), interleukin-1 receptor antagonist-(IL-1ra) and interleukin-1 receptor type I-(IL-1R tl) mRNA-expression in single preimplantation mouse embryos at various developmental stages** *44th Annual Meeting of the Society-for-Gynecologic-Investigation*  
Kruessel, J. S., Huang, H. Y., Wen, Y., Kloodt, A. R., Bielfeld, P., Polan, M. L.  
ELSEVIER IRELAND LTD.1997: 103–20
  - **Use of reverse transcription-polymerase chain reaction to detect embryonic interleukin-1 system messenger RNA in individual preimplantation mouse embryos co-cultured with Vero cells** *HUMAN REPRODUCTION*  
Huang, H. Y., Krussel, J. S., Wen, Y., Polan, M. L.  
1997; 12 (7): 1537-1544
  - **Role of embryonic factors in human implantation** *ESHRE Workshop on Maternal-Embryo Interactions*  
Polan, M. L., Simon, C., Frances, A., Lee, B. Y., PRICHARD, L. E.  
OXFORD UNIV PRESS.1995: 22–29
  - **GONADAL-STEROIDS MODULATE INTERLEUKIN-1 RECEPTOR ANTAGONIST MESSENGER-RNA EXPRESSION IN CULTURED HUMAN MONOCYTES** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*  
Lee, B. Y., Huynh, T., PRICHARD, L. E., McGuire, J., Polan, M. L.  
1995; 209 (1): 279-285
  - **GENE-REGULATION OF INTERLEUKIN-1-BETA, INTERLEUKIN-1 RECEPTOR-TYPE-I, AND PLASMINOGEN-ACTIVATOR INHIBITOR-1 AND INHIBITOR-2 IN HUMAN GRANULOSA-LUTEAL CELLS** *FERTILITY AND STERILITY*  
Piquette, G. N., Simon, C., ELDANASOURI, I., Frances, A., Polan, M. L.  
1994; 62 (4): 760-770
  - **INTERLEUKIN-1 RECEPTOR ANTAGONIST SUPPRESSES HUMAN CHORIONIC GONADOTROPIN-INDUCED OVULATION IN THE RAT** *BIOLOGY OF REPRODUCTION*  
Simon, C., Tsafirri, A., Chun, S. Y., Piquette, G. N., Dang, W., Polan, M. L.  
1994; 51 (4): 662-667
  - **DETECTION OF APOPTOSIS IN HUMAN AND RAT OVARIAN FOLLICLES** *JOURNAL OF THE SOCIETY FOR GYNECOLOGIC INVESTIGATION*  
Piquette, G. N., Tilly, J. L., PRICHARD, L. E., Simon, C., Polan, M. L.  
1994; 1 (4): 297-301
  - **CYTOKINES AND REPRODUCTION** *WESTERN JOURNAL OF MEDICINE*  
Simon, C., Polan, M. L.  
1994; 160 (5): 425-429
  - **INTERLEUKIN-1 SYSTEM IN THE MATERNO-TROPHOBLAST UNIT IN HUMAN IMPLANTATION - IMMUNOHISTOCHEMICAL EVIDENCE FOR AUTOCRINE/PARACRINE FUNCTION** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Simon, C., Frances, A., PIQUETTE, G., Hendrickson, M., Milki, A., Polan, M. L.  
1994; 78 (4): 847-854

- **THE EFFECT OF INTERLEUKIN-1-BETA (IL-1-BETA) ON THE REGULATION OF IL-1 RECEPTOR-TYPE-I MESSENGER-RIBONUCLEIC-ACID AND PROTEIN-LEVELS IN CULTURED HUMAN ENDOMETRIAL STROMAL AND GLANDULAR CELLS** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Simon, C., Piquette, G. N., Frances, A., ELDANASOURI, I., Irwin, J. C., Polan, M. L.  
1994; 78 (3): 675-682
- **EMBRYONIC IMPLANTATION IN MICE IS BLOCKED BY INTERLEUKIN-1 RECEPTOR ANTAGONIST** *ENDOCRINOLOGY*  
Simon, C., Frances, A., Piquette, G. N., ELDANASOURI, I., Zurawski, G., Dang, W., Polan, M. L.  
1994; 134 (2): 521-528
- **IMMUNOHISTOCHEMICAL LOCALIZATION OF THE INTERLEUKIN-1 SYSTEM IN THE MOUSE OVARY DURING FOLLICULAR-GROWTH, OVULATION, AND LUTEINIZATION** *BIOLOGY OF REPRODUCTION*  
Simon, C., Frances, A., PIQUETTE, G., Polan, M. L.  
1994; 50 (2): 449-457
- **LOCALIZATION OF INTERLEUKIN-1 TYPE-I RECEPTOR AND INTERLEUKIN-1-BETA IN HUMAN ENDOMETRIUM THROUGHOUT THE MENSTRUAL-CYCLE** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Simon, C., Piquette, G. N., Frances, A., Polan, M. L.  
1993; 77 (2): 549-555
- **INTERLEUKIN-1 TYPE-I RECEPTOR MESSENGER-RIBONUCLEIC-ACID EXPRESSION IN HUMAN ENDOMETRIUM THROUGHOUT THE MENSTRUAL-CYCLE** *FERTILITY AND STERILITY*  
Simon, C., Piquette, G. N., Frances, A., Westphal, L. M., Heinrichs, W. L., Polan, M. L.  
1993; 59 (4): 791-796
- **REGULATION OF PLASMINOGEN-ACTIVATOR INHIBITOR-1 AND INHIBITOR-2 MESSENGER-RIBONUCLEIC-ACID LEVELS IN HUMAN CUMULUS AND GRANULOSA-LUTEAL CELLS** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*  
Piquette, G. N., CRABTREE, M. E., ELDANASOURI, I., Milki, A., Polan, M. L.  
1993; 76 (2): 518-523