

# Progesteron: Genitale und extragenitale Wirkungen

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## Literatur

- [1] Barrat J, de Lignières B, Marpeau L et al. The in vivo effect of the local administration of progesterone on the mitotic activity of human ductal breast tissue. Results of a pilot study. *J Gynecol Obstet Biol Reprod (Paris)* 1990; 19: 269–274
- [2] Benster B, Carey A, Wadsworth F et al. A double-blind placebo-controlled study to evaluate the effect of progestelle progesterone cream on postmenopausal women. *Menopause Int* 2009; 15: 63–69
- [3] Beral V, Million Women Study Collaborators. Breast cancer and hormone-replacement therapy in the Million Women Study. *Lancet* 2003; 362: 419–427
- [4] Beral V, Bull D, Reeves G, Million Women Study Collaborators. Endometrial cancer and hormone-replacement therapy in the Million Women Study. *Lancet* 2005; 365: 1543–1551
- [5] Beral V. Ovarian cancer and hormone replacement therapy in the Million Women Study. *Lancet* 2007; 369: 1703–1710
- [6] Bulletti C, De Ziegler D, Giacomucci E et al. Vaginal drug delivery: the first uterine pass effect. *Ann N Y Acad Sci* 1997; 828: 285–290
- [7] Campagnoli C, Clavel-Chapelon F, Kaaks R et al. Progestins and progesterone in hormone replacement therapy and the risk of breast cancer. *J Steroid Biochem Mol Biol* 2005; 96: 95–108
- [8] Clarke CL, Southerland RL. Progesterone regulation of cellular proliferation. *Endocrine Reviews* 1990; 11: 266–301
- [9] De Lignieres B, Dennerstein L, Backstrom T. Influence of route of progesterone metabolism. *Maturitas* 1995; 21: 251–257
- [10] De Lignieres B. Endometrial hyperplasia. Risks, recognition and the search for a safe hormone replacement regimen. *J Reprod Med* 1999; 44 (Suppl. 2): 191–196
- [11] De Lignieres B, de Vathaire F, Fournier S et al. Combined hormone replacement therapy and risk of breast cancer in a French cohort study of 3175 women. *Climacteric* 2002; 5: 332–340
- [12] Fabre A, Fournier A, Mesrine S et al. Oral progestagens before menopause and breast cancer risk. *Br J Cancer* 2007; 96: 841–844
- [13] Flesch-Janys D, Slinger T, Mutschelknauss E et al. Risk of different histological types of postmenopausal breast cancer by type and regimen of menopausal hormone therapy. *Int J Cancer* 2008; 123: 933–941
- [14] Foidart JM, Colin C, Denoo X et al. Estradiol and progesterone regulate the proliferation of human breast epithelial cells. *Fertil Steril* 1998; 69: 963–969
- [15] Fournier A, Berrino F, Riboli E et al. Breast cancer risk in relation to different types of hormone replacement therapy in the E3 N-EPIC cohort. *Int J Cancer* 2005; 114: 448–454
- [16] Fournier A, Berrino F, Clavel-Chapelon F. Unequal risks for breast cancer associated with different hormone replacement therapies: results from the E3 N cohort study. *Breast Cancer Res Treat* 2008; 107: 103–111
- [17] Graham JD, Yager ML, Hill HD et al. Altered progesterone receptor isoform expression remodels progesterin responsiveness of breast cancer cells. *Mol Endocrinol* 2005; 19: 2713–2735
- [18] Graham JD, Mote PA, Salagame U et al. DNA replication licensing and progenitor numbers are increased by progesterone in normal human breast. *Endocrinology* [Epub ahead of print: 2009 Apr 2]
- [19] Gregg C, Shikar V, Larsen P et al. White matter plasticity and enhanced remyelination in the maternal CNS. *J Neurosci* 2007; 27: 1812–1823
- [20] Groshong SD, Owen GI, Grimison B et al. Biphasic regulation of breast cancer cell growth by progesterone: role of the cyclin-dependent kinase inhibitors, p21 and p27 (Kip1). *Mol Endocrinol* 1997; 11: 1593–1607
- [21] Hart AR, Luben R, Welch A et al. Hormone replacement therapy and symptomatic gallstones – a prospective population study in the EPIC-Norfolk cohort. *Digestion* 2008; 77: 4–9
- [22] Hermsmeyer RK, Mishra RG, Pavcnik D et al. Prevention of coronary hyperreactivity in preatherogenic menopausal rhesus monkeys by transdermal progesterone. *Arterioscler Thromb Vasc Biol* 2004; 24: 955–961
- [23] Hermsmeyer RK, Thompson TL, Pohost GM et al. Cardiovascular effects of medroxyprogesterone acetate and progesterone: a case of mistaken identity? *Nat Clin Pract Cardiovasc Med* 2008; 5: 387–395
- [24] Ho SM. Estrogen, progesterone and epithelial ovarian cancer. *Reprod Biol Endocrinol* 2003; 1: 73–81
- [25] Holtorf K. The bioidentical hormone debate: are bioidentical hormones (estradiol, estriol, and progesterone) safer or more efficacious than commonly used synthetic versions in hormone replacement therapy? *Postgrad Med* 2009; 121: 73–85
- [26] Ibanez C, Shields SA, El-Etr M et al. Systemic progesterone administration results in a partial reversal of the age-associated decline in CNS remyelination following toxin-induced demyelination in male rats. *Neuropathol Appl Neurobiol* 2004; 30: 80–89
- [27] Jacobsen BM, Schittone SA, Richer JK et al. Progesterone-independent effects of human progesterone receptors (PRs) in estrogen receptor-positive breast cancer: PR isoform-specific gene regulation and tumor biology. *Mol Endocrinol* 2005; 19: 574–587
- [28] Kaaks R, Berrino F, Timothy Key T et al. Serum sex steroids in premenopausal women and breast cancer risk within the European prospective investigation into cancer and

- nutrition (EPIC). *J Natl Cancer Inst* 2005; 97: 755–765
- [29] Koenig HL, Gong WH, Pelissier P. Role of progesterone in peripheral nerve repair. *Rev Reprod* 2000; 5: 189–199
- [30] Kovari E, Gold G, Herrmann FR et al. Cortical microinfarcts and demyelination significantly affect cognition in brain aging. *Stroke* 2004; 35: 410–414
- [31] Leo JC, Wang SM, Guo CH et al. Gene regulation profile reveals consistent anticancer properties of progesterone in hormone-independent breast cancer cells transfected with progesterone receptor. *Int J Cancer* 2005; 117: 561–568
- [32] Leonelli E, Bianchi R, Cavaletti G et al. Progesterone and its derivatives are neuroprotective agents in experimental diabetic neuropathy: a multimodal analysis. *Neuroscience* 2007; 144: 1293–1304
- [33] L'hermite M, Simoncini T, Fuller S et al. Could transdermal estradiol + progesterone be a safer postmenopausal HRT? A review. *Maturitas* 2008; 60: 185–201
- [34] Liang M, Liao EY, Xu X et al. Effects of progesterone and 18-methyl levonorgestrel on osteoblastic cells. *Endocr Res* 2003; 29: 483–501
- [35] Liu B, Beral V, Balkwill A et al. and for the Million Women Study Collaborators. Gallbladder disease and use of transdermal versus oral hormone replacement therapy in postmenopausal women: prospective cohort study. *BMJ* 2008; 337: 386–395
- [36] Micheli A, Muti P, Secreto G et al. Endogenous sex hormones and subsequent breast cancer in premenopausal women. *Int J Cancer* 2004; 112: 312–318
- [37] Mote PA, Graham JD, Clarke CL. Progesterone receptor isoforms in normal and malignant breast. *Ernst Schering Found Symp Proc* 2007; 1: 77–107
- [38] Minshall RD, Stanczyk FZ, Miyagawa K et al. Ovarian steroid protection against coronary artery hyperreactivity in rhesus monkeys. *J Clin Endocrinol Metab* 1998; 83: 649–659
- [39] Musgrove EA, Lee CS, Sutherland RL. Progesterins both stimulate and inhibit breast cancer cell cycle progression while increasing expression of transforming growth factor alpha, epidermal growth factor receptor, c-fos, and c-myc genes. *Mol Cell Biol* 1991; 11: 5032–5043
- [40] Nilsen J, Brinton RD. Impact of progestins on estrogen-induced neuroprotection: synergy by progesterone and 19-norprogesterone and antagonism by medroxyprogesterone acetate. *Endocrinology* 2002; 143: 205–212
- [41] Oelkers WK. Effects of estrogens and progestogens on the renin-aldosterone system and blood pressure. *Steroids* 1996; 61: 166–171
- [42] Opatrny L, Dell'Aniello S, Assouline S et al. Hormone replacement therapy and variations in the risk of breast cancer. *Br J Obstet Gynecol* 2008; 115: 169–175
- [43] Otsuki M, Saito H, Xu X et al. Progesterone, but not medroxyprogesterone, inhibits vascular cell adhesion molecule-1 expression in human vascular endothelial cells. *Arterioscler Thromb Vasc Biol* 2001; 21: 243–248
- [44] Pei W, Bellows CG, Jia Y et al. Effect of age on progesterone receptor expression, and osteoprogenitor proliferation and differentiation in female rat vertebral cell populations. *J Endocrinol* 2006; 190: 261–270
- [45] PEPI-Trial. Effects of hormone replacement therapy on endometrial histology in postmenopausal women. The postmenopausal estrogen/progestin interventions (PEPI) trial. The writing group for the PEPI trial. *JAMA* 1996; 275: 370–375
- [46] Prentice RL, Chlebowski RT, Stefanick ML et al. Estrogen plus progestin therapy and breast cancer in recently postmenopausal women. *Am J Epidemiol* 2008; 167: 1207–1216
- [47] Prentice RL, Chlebowski RT, Stefanick ML et al. Conjugated equine estrogens and breast cancer risk in the Women's Health Initiative clinical trial and observational study. *Am J Epidemiol* 2008; 167: 1407–1415
- [48] Prentice RL, Manson JE, Langer RD et al. Benefits and risks of postmenopausal hormone therapy when it is initiated soon after menopause. *Am J Epidemiol* [Epub ahead of print: 2009 May 25]
- [49] Quinkler M, Diederich S, Bähr V et al. The role of progesterone metabolism and androgen synthesis in renal blood pressure regulation. *Horm Metab Res* 2004; 36: 381–386
- [50] Rabe T, Geithövel F, Hadji P et al. Hormonersatztherapie – Nutzen und Risiken. *J Reproduktionsmed Endocrinol* 2006; 3: 155–165
- [51] Römmler A. Paradigmenwechsel bei der Substitution mit Östrogenen. *ZS Orthomol Med* 2003; 3: 13–17
- [52] Römmler A. Endokrinologische Aspekte der Anti-Aging-Medizin. *CME Praktische Fortbildung Gynäkologie, Geburtsmedizin, Gynäkologische Endokrinologie. akademos* 2006; 3: 18–34
- [53] Römmler A. Update Hormonersatz: Bioidentische Hormongaben sind risikoarm. *Zs f Orthomol Med* 2007; 2: 16–21
- [54] Rossouw JE, Anderson GL, Prentice RL et al., Writing Group for the Women's Health Initiative Investigators. Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women's Health Initiative randomized controlled trial. *JAMA* 2002; 288: 321–333
- [55] Schumacher M, Guennoun R, Robert F et al. Local synthesis and dual actions of progesterone in the nervous system: neuroprotection and myelination. *Growth Horm IGF Res* 2004; 14 (Suppl. A): S18–S33
- [56] Schumacher M, Guennoun R, Ghomari A et al. Novel perspectives for progesterone in hormone replacement therapy, with special reference to the nervous system. *Endocr Rev* 2007; 28: 387–439
- [57] Stefanick ML, Anderson GL, Margolis KL et al. WHI Investigators. Effects of conjugated equine estrogens on breast cancer and mammography screening in postmenopausal women with hysterectomy. *JAMA* 2006; 295: 1647–1657
- [58] Simoncini T, Mannella P, Fornari L et al. Differential signal transduction of progesterone and medroxyprogesterone acetate in human endothelial cells. *Endocrinology* 2004; 145: 5745–5756
- [59] Vashisht A, Wadsworth F, Carey A et al. Bleeding profiles and effects on the endometrium for women using a novel combination of transdermal oestradiol and natural progesterone cream as part of a continuous combined hormone replacement regime. *BJOG* 2005; 112: 1402–1406
- [60] Vassilev V, Pretto CM, Cornet PB et al. Response of matrix metalloproteinases and tissue inhibitors of metalloproteinases messenger ribonucleic acids to ovarian steroids in human endometrial explants mimics their gene- and phase-specific differential control in vivo. *J Clin Endocrinol Metab* 2005; 90: 5848–5857
- [61] Weiderpass E, Adami HO, Baron JA et al. Risk of endometrial cancer following estrogen replacement with and without progestins. *J Natl Cancer Inst*. 1999; 91: 1131–1137

- [62] Wood CE, Register TC, Lees CJ et al. Effects of estradiol with micronized progesterone or medroxyprogesterone acetate on risk markers for breast cancer in postmenopausal monkeys. *Breast Cancer Res Treat* 2007; 101: 125–134
- [63] Wood CE, Register TC, Cline JM. Transcriptional profiles of progestogen effects in the postmenopausal breast. *Breast Cancer Res Treat* 2009; 114: 233–242
- [64] Zhao C, Fancy SP, Magy L et al. Stem cells, progenitors and myelin repair. *J Anat* 2005; 207: 251–258
- [65] Zhou B, Sun Q, Cong R et al. Hormone replacement therapy and ovarian cancer risk: a meta-analysis. *Gynecol Oncol* 2008; 108: 641–651