



CODEN [USA]: IAJPBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

<http://doi.org/10.5281/zenodo.997180>

Available online at: <http://www.iajps.com>

Review Article

THE ROLE OF PROGESTERONE IN THE PROGNOSIS OF BREAST CANCER-A REVIEW

Fateme parooei ¹, Mahmood Anbari ^{2*}, Morteza Salarzaei ¹

¹ Medical Student, Student Research Committee, Zabol University of Medical Sciences, zabol, Iran

² Zabol University of Medical Sciences, zabol, Iran

Abstract:

Introduction: According to published statistics by the World Health Organization in 2011, cancer is the second leading cause of death after cardiovascular diseases throughout the world. The American Cancer Society announced in its latest report that out of every eight women, one is diagnosed with breast cancer. The rate of cancer in developed countries is increasing from 1 to 0.2% and in developing countries about 0.5% annually.

Methods: In this review article, the databases Medline, Cochrane, Science Direct, and Google Scholar were thoroughly searched to identify The Role of Progesterone in the Prognosis of Breast Cancer. In this review, the papers published until early January 2017 that were conducted to study The Role of Progesterone in the Prognosis of Breast Cancer were selected.

Results: Progesterone and its receptors connect to the nucleus of the cells of the target tissue to cause a series of changes in the expression of responding to the relevant hormone. The free hormone in the serum goes through the membrane without receiving help from any special protein to connect to its special receptors in the nucleus.

Discussion and conclusion: Investigating these receptors are of more importance especially in patients with breast cancer who have developed the disease at ages prior to menopause and also in high risk groups, because knowing the status of these receptors in these groups of patients increases two to three times the chances of choosing hormone treatments in patients that have the highest level of responding to hormone manipulation.

Key words: Progesterone, Prognosis, Breast Cancer

Corresponding author:

Mahmood Anbari,

Zabol University of Medical Sciences,
Zabol, Iran

Email: mr.mortezasalar@gmail.com

Tell : +989120644917

QR code



Please cite this article in press as Mahmood Anbari et al, **The Role of Progesterone in the Prognosis of Breast Cancer-A Review**, Indo Am. J. P. Sci, 2017; 4(09).

INTRODUCTION:

According to published statistics by the World Health Organization in 2011, cancer is the second leading cause of death after cardiovascular diseases throughout the world. The American Cancer Society announced in its latest report that out of every eight women, one is diagnosed with breast cancer (1). The rate of cancer in developed countries is increasing from 1 to 0.2% and in developing countries about 0.5% annually. According to a report by the World Health Organization in 2011, cancer in Iran was reported to be 12% widespread and was recognized as the third most common cause of death (2). Gastric cancer, breast cancer, and colorectal cancer are the three common cancers in Iran respectively. Breast cancer is the first place cancer widespread among women (3). The average age of breast cancer diagnosis in the Western countries is 56 years and in Iran 45 years. New developments in the patients care with breast cancer have increased the overall survival rate of the patients in recent years. This increase in survival has doubled the importance of predictive factors of local recurrence and distant metastases of the disease (4). In addition, it should be noted that the progression or regression of some diseases are not constant over time, as in the stages of recovery or worsening of the disease, the occurrence of some consequences changes the course of the disease, and the disease progress declines and this risk begins to decrease in the 2-5 years after treatment, which make the recovery process speed (5).

METHODS:

In this review article, the databases Medline, Cochrane, Science Direct, and Google Scholar were thoroughly searched to identify The Role of Progesterone in the Prognosis of Breast Cancer. In this review, the papers published until early January 2017 that were conducted to study The Role of Progesterone in the Prognosis of Breast Cancer were selected.

RESULTS:

Progesterone and its receptors connect to the nucleus of the cells of the target tissue to cause a series of changes in the expression of responding to the relevant hormone. The free hormone in the serum goes through the membrane without receiving help from any special protein to connect to its special receptors in the nucleus (6). These receptors, which have characteristics and high tendency to react with progesterone, are divided into the following two groups: PR-A progesterone receptors and PR-B progesterone receptors (7). These receptors exist in the target tissue like breast, genitalia, and also the brain to cause growth and development in breast and genital organs, preparing the breast for pregnancy and lactation, and also to

control sexual behavior. PR-A+ cells decrease in number in mature mammary glands and also after menstrual period is over, while the percentage of PR-B+ cells during different periods of breast growth remain almost stable (8). In a certain percentage of breast cells, only PR-B cells can be found. During the process of breast development and especially during pregnancy, a high percentage of PR-B+ cells become positive also in terms of bromodeoxyuridine, which may be an indicator of direct progesterone stimulatory effects through PR-B in order to proliferate cells. Therefore, it can be concluded that the two isoforms of progesterone receptors, namely PR-A and PR-B, have different capabilities in terms of gene activation in target tissues (9). However, it is not still quite clear through which of these two isoforms the effects of progesterone is applied to the natural and malignant breast tissues.

DISCUSSION AND CONCLUSION:

Prognosis factors are indicators that can help groups that are treating cancer in estimating the outcome of the disease, the patient's longevity, and the period of life without having a disease (10). Treatment-determining factors are the ones that can be used to determine special treatments for certain qualified patients. Determining the status of estrogen and progesterone receptors have received considerable attention from many years ago as one of the most important factors that can play an important role both in estimating the prognosis of the disease and in determining the treatment (11). Progesterone receptors in breast tissue can chose and control special genetic plans that cause the development of mammary glands and the processes involved in starting and the progression of breast cancer (12). As progesterone causes special changes in the normal tissue of the breast during maturation process, pregnancy, and lactation, it also causes major effects on cancer tissues in the breast, such as abnormal proliferation and inducing invasive tumor behaviors (13). Progesterone causes these effects through phosphorylation reactions through which progesterone receptors chose special genes as the target so that progesterone and other mitogen factors like EGF and heregulin can cause abnormal proliferation in breast tissue and change it into cancer tissues (14). Investigating these receptors are of more importance especially in patients with breast cancer who have developed the disease at ages prior to menopause and also in high risk groups, because knowing the status of these receptors in these groups of patients increases two to three times the chances of choosing hormone treatments in patients that have the highest level of responding to hormone manipulation.

REFERENCES:

- 1.Bauer KR, Brown M, Cress RD, Parise CA, Caggiano V. Descriptive analysis of estrogen receptor (ER)-negative, progesterone receptor (PR)-negative, and HER2-negative invasive breast cancer, the so-called triple-negative phenotype. *Cancer.* 2007 May 1;109(9):1721-8.
- 2.Hammond, M.E.H., Hayes, D.F., Dowsett, M., Allred, D.C., Hagerty, K.L., Badve, S., Fitzgibbons, P.L., Francis, G., Goldstein, N.S., Hayes, M. and Hicks, D.G., 2010. American Society of Clinical Oncology/College of American Pathologists guideline recommendations for immunohistochemical testing of estrogen and progesterone receptors in breast cancer (unabridged version). *Archives of pathology & laboratory medicine,* 134(7), pp.e48-e72.
- 3.Cuzick J, Dowsett M, Pineda S, Wale C, Salter J, Quinn E, Zabaglo L, Mallon E, Green AR, Ellis IO, Howell A. Prognostic value of a combined estrogen receptor, progesterone receptor, Ki-67, and human epidermal growth factor receptor 2 immunohistochemical score and comparison with the Genomic Health recurrence score in early breast cancer. *Journal of Clinical Oncology.* 2011 Oct 11;29(32):4273-8.
- 4.Prat A, Cheang MC, Martín M, Parker JS, Carrasco E, Caballero R, Tyldesley S, Gelmon K, Bernard PS, Nielsen TO, Perou CM. Prognostic significance of progesterone receptor-positive tumor cells within immunohistochemically defined luminal A breast cancer. *Journal of clinical oncology.* 2012 Dec 10;31(2):203-9.
- 5.Rakha EA, El-Sayed ME, Green AR, Lee AH, Robertson JF, Ellis IO. Prognostic markers in triple-negative breast cancer. *Cancer.* 2007 Jan 1;109(1):25-32.
- 6.Kyndi M, Sørensen FB, Knudsen H, Overgaard M, Nielsen HM, Overgaard J. Estrogen receptor, progesterone receptor, HER-2, and response to postmastectomy radiotherapy in high-risk breast cancer: the Danish Breast Cancer Cooperative Group. *Journal of Clinical Oncology.* 2008 Mar 20;26(9):1419-26.
- 7.Arpino G, Weiss H, Lee AV, Schiff R, De Placido S, Osborne CK, Elledge RM. Estrogen receptor-positive, progesterone receptor-negative breast cancer: association with growth factor receptor expression and tamoxifen resistance. *Journal of the National Cancer Institute.* 2005 Sep 7;97(17):1254-61.
- 8.Lowery AJ, Miller N, Devaney A, McNeill RE, Davoren PA, Lemetre C, Benes V, Schmidt S, Blake J, Ball G, Kerin MJ. MicroRNA signatures predict oestrogen receptor, progesterone receptor and HER2/neu receptor status in breast cancer. *Breast cancer research.* 2009 May 11;11(3):R27.
- 9.Cui X, Schiff R, Arpino G, Osborne CK, Lee AV. Biology of progesterone receptor loss in breast cancer and its implications for endocrine therapy. *Journal of Clinical Oncology.* 2005 Oct 20;23(30):7721-35.
- 10.Dowsett M, Houghton J, Iden C, Salter J, Farndon J, A'hern R, Sainsbury R, Baum M. Benefit from adjuvant tamoxifen therapy in primary breast cancer patients according oestrogen receptor, progesterone receptor, EGF receptor and HER2 status. *Annals of Oncology.* 2006 Feb 23;17(5):818-26.
- 11.Minn AJ, Gupta GP, Siegel PM, Bos PD, Shu W, Giri DD, Viale A, Olshen AB, Gerald WL, Massagué J. Genes that mediate breast cancer metastasis to lung. *Nature.* 2005 Jul 28;436(7050):518.
- 12.Blackwell KL, Burstein HJ, Storniolo AM, Rugo HS, Sledge G, Aktan G, Ellis C, Florance A, Vukelja S, Bischoff J, Baselga J. Overall survival benefit with lapatinib in combination with trastuzumab for patients with human epidermal growth factor receptor 2-positive metastatic breast cancer: final results from the EGF104900 study. *Journal of Clinical Oncology.* 2012 Jun 11;30(21):2585-92.
- 13.Finn RS, Press MF, Dering J, Arbushites M, Koehler M, Oliva C, Williams LS, Di Leo A. Estrogen receptor, progesterone receptor, human epidermal growth factor receptor 2 (HER2), and epidermal growth factor receptor expression and benefit from lapatinib in a randomized trial of paclitaxel with lapatinib or placebo as first-line treatment in HER2-negative or unknown metastatic breast cancer. *Journal of Clinical Oncology.* 2009 Jul 20;27(24):3908-15.
- 14.Brown M, Tsodikov A, Bauer KR, Parise CA, Caggiano V. The role of human epidermal growth factor receptor 2 in the survival of women with estrogen and progesterone receptor-negative, invasive breast cancer: The California Cancer Registry, 1999–2004. *Cancer.* 2008 Feb 15;112(4):737-47.