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Hormonal Therapy: Modalities in Cancer Therapy

Emmett Walters*

Department of Biology, Islamic Azad University, Hamedan, Iran

Opinion Article

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***For Correspondence:** Emmett Walters, Department of Biology, Islamic Azad University, Hamedan, Iran

E-mail: walters.emmett@gmail.com

DESCRIPTION

Hormonal therapy in oncology is cancer hormone therapy, and it is one of the major modalities of medical oncology (pharmacotherapy for cancer), along with cytotoxic chemotherapy and targeted therapy (bio-therapeutics). It entails endocrine system manipulation *via* exogenous or external administration of specific hormones, particularly steroid hormones, or drugs that inhibit the production or activity of such hormones (hormone antagonists). Because steroid hormones are powerful drivers of gene expression in certain cancer cells, altering their levels or activity can cause certain cancers to stop growing or even die. Hormonal therapy may also include surgical endocrine organ removal, such as orchiectomy and oophorectomy. Hormone therapy is used to treat cancers that arise from hormonally responsive tissues, such as the breast, prostate, endometrium, and adrenal cortex. Hormonal therapy may also be used to treat Para neoplastic syndromes or to alleviate symptoms associated with cancer and chemotherapy, such as anorexia. The use of the selective estrogenic-response modulator tamoxifen for the treatment of breast cancer is perhaps the most well-known example of hormonal therapy in oncology, though aromatase inhibitors, another class of hormonal agents, are now playing an expanding role in that disease. One effective strategy for depriving tumour cells of growth and survival hormones is to use drugs that inhibit hormone production in the organ of origin.

Aromatase inhibitors

Aromatase inhibitors are an important class of drugs used to treat post-menopausal women with breast cancer. The ovaries stop producing estrogen during menopause, but other tissues continue to produce estrogen *via* the action of the enzyme aromatase on androgens produced by the adrenal glands. When aromatase activity is inhibited, estrogen levels in post-menopausal women can fall to dangerously low levels, causing growth arrest and/or apoptosis of hormone-responsive cancer cells. Letrozole and anastrozole are aromatase inhibitors that have been

shown to be more effective than tamoxifen in the first-line treatment of post-menopausal women with breast cancer.

Exemestane is an irreversible aromatase inactivator that outperforms megestrol acetate in the treatment of tamoxifen-resistant metastatic breast cancer and does not appear to have the osteoporosis-promoting side effects of other drugs in this class. Amino-glutethimide inhibits aromatase and other enzymes involved in the synthesis of steroid hormones in the adrenal glands. It was once used to treat breast cancer, but more selective aromatase inhibitors have since taken its place. It's also used to treat hyper adrenocortical syndromes like Cushing's and hyper aldosteronism in adrenocortical carcinoma.

GnRH analogues

Analogs of Gonadotropin-Releasing Hormone (GnRH) can be used to induce chemical castration, or complete suppression of estrogen and progesterone production from the female ovaries or testosterone production from the male testes. This is due to a negative feedback effect caused by the constant stimulation of the pituitary gland by these hormones. Leuprorelin and goserelin are GnRH analogues that are primarily used to treat hormone-responsive prostate cancer. Because the initial endocrine response to GnRH analogues is actually hyper secretion of gonadal steroids, hormone receptor antagonists such as flutamide are commonly used to prevent a transient increase in tumor growth.

Analogs of Gonadotropin-Releasing Hormone (GnRH) can be used to induce chemical castration, which is the complete suppression of estrogen and progesterone production from the female ovaries or testosterone production from the male testes. This is due to a negative feedback effect of these hormones continuous stimulation of the pituitary gland. GnRH analogues leuprorelin and goserelin are primarily used to treat hormone-responsive prostate cancer. Because the initial endocrine response to GnRH analogues is actually gonadal steroid hyper secretion, hormone receptor antagonists such as flutamide are commonly used to prevent a transient increase in tumor growth. The Interferon’s and cytokines, which stimulate the immune system, have been used to treat specific cancers, including renal cell carcinoma and melanoma.