
Breast cancer and oestrogen

Summary

- Around 70 per cent of breast cancers are sensitive to the female sex hormone oestrogen.
 - The growth of cancer can be minimised by taking drugs that block the production and action of oestrogens in the breasts.
 - Side effects of endocrine therapy include hot flushes, joint stiffness and osteoporosis.
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There are many different types of breast cancer. Around 70 per cent of them are sensitive to the female sex hormone oestrogen. Cells from these types of cancer have receptor sites that bind to oestrogen, which promotes their growth and spread. These cancers are known as oestrogen receptor positive cancers (or ER-positive cancers). Cells from tumours are tested to see if they have these receptors. If so, hormone (or endocrine) therapy may be used as a treatment.

Before menopause the female hormones oestrogen and progesterone are produced by the ovaries. After menopause oestrogen is made in body fat, such as that found in the breast.

Hormone therapy works by lowering the amount of oestrogen in the body, or by blocking its ability to attach to breast cancer cells. It may be used to stop oestrogen production in the ovaries (before menopause), prevent the production of oestrogen in fat cells (post-menopause), or prevent oestrogen from interacting with tumour cells. It can reduce the chances of breast cancer developing again, or spreading.

Breast cancer in women before the age of 25 is rare, but the risk of developing breast cancer increases with age.

Breast cancer in postmenopausal women

Breast cancer is most common in postmenopausal women, and most breast cancers in postmenopausal women are hormone receptor positive. As women age, the fat cells in their breasts tend to produce greater and greater amounts of an enzyme called aromatase. Aromatase promotes the production of oestrogen. Consequently, with age, the levels of oestrogen present in women's breasts increases. This locally produced oestrogen plays a role in both the development and growth of breast cancer in postmenopausal women. Once established, the tumour acts to increase oestrogen levels to help it grow, with immune cells appearing to boost oestrogen production. Recent studies have also identified a link between obesity and oestrogen production. Data demonstrating that obesity carries a two-fold increased risk of developing breast cancer in older women supports these findings. This makes sense considering that obese women have more of the fat cells responsible for producing oestrogens.

Treatment for ER-positive breast cancer

Treatments for ER-positive breast cancers may include:

- surgery, including
 - lumpectomy (removal of the tumour, some of the surrounding breast tissue and nearby lymph nodes in the armpit)
 - mastectomy (removal of the entire breast)
 - radiotherapy – using precisely targeted x-rays to destroy cancer cells
 - chemotherapy – using medication to destroy cancer cells
 - hormone therapy (endocrine therapy), which may involve
 - using medication (anti-oestrogens) to stop oestrogen from helping breast cancer cells to grow
 - using ovarian suppression medication or surgery to stop the ovaries from producing oestrogen (in women of child-bearing age)
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- using medication (aromatase inhibitors) to stop oestrogen production in fat cells (in post-menopausal women)
- a combination of these.

Breast cancer and hormone (endocrine) therapy

There are several different types of hormone therapies. They may be used before or after breast surgery, after chemotherapy or radiotherapy, in place of surgery (for example, in situations where surgery is not possible due to other health problems), or if breast cancer has spread or returned.

Ovarian suppression therapy

Ovarian suppression can be an effective treatment for ER-positive breast tumours in women of child-bearing age. Ovarian suppression therapies stop the ovaries from making oestrogen. They are only suitable for women who have not yet reached menopause.

Ovarian suppression involves either:

- surgical removal of the ovaries (ablation) – which leads to a permanent decrease in oestrogen production, or
- use of a gonadotropin-releasing hormone – which leads to a temporary decrease in oestrogen production.

Anti-oestrogen hormone therapy

Anti-oestrogen medications are used to block oestrogen production or action. The most commonly used anti-oestrogen medication is tamoxifen. It is often used after surgery, and acts to lower the risk of recurrence of breast cancer, or its spread to the other breast. Although anti-oestrogen hormone therapies can have a number of side effects, for most women, the benefits far outweigh the risks.

Side effects of tamoxifen may include:

- hot flushes
- trouble sleeping
- vaginal dryness
- vaginal discharge
- low mood
- weight gain
- irregular periods
- hair loss
- decreased libido
- skin changes
- fatigue.

Tamoxifen can be used to treat women of any age.

Aromatase inhibitor therapy

Medications that stop oestrogen production in fatty tissue are known as aromatase inhibitors (AIs). Examples include letrozole, anastrozole and exemestane. AIs prevent aromatase from producing oestrogens and so reduce the amount of oestrogens within the breast.

AIs have been shown to have more benefits and fewer serious side effects than tamoxifen. Newer therapies include medications that cause the degradation of the oestrogen receptor, for example, fulvestrant.

Possible side effects of aromatase inhibitors include:

- hot flushes
- joint stiffness

- osteoporosis.

Aromatase inhibitors are only given to post-menopausal women.

Current research is focusing on newer compounds designed to block oestrogen production in the breast only, as the body still needs oestrogen for healthy bones, among other things.

Breast cancer and hormone replacement therapy

Menopause can trigger unpleasant side effects such as hot flushes and vaginal dryness. Hormone replacement therapy (HRT) eases the symptoms by boosting sex hormone levels. It also reduces the risk of osteoporosis and heart disease.

Since some breast cancers depend on oestrogen, women taking HRT for a long time (more than five years) have a 0.3-fold increased risk. Women who undergo HRT for shorter periods (such as two years) have the same risk of breast cancer as women who have not used HRT. The health benefits of HRT in women in early post-menopause may outweigh the risks in many cases.

Where to get help

- Your **GP (doctor)**
- **Cancer Council Victoria, Information and Support Service** Tel. **13 11 20**
- **Multilingual Cancer Information Line**, Victoria Tel. **13 14 50**
- **WeCan website** helps people affected by cancer find the information, resources and support services they may need following a diagnosis of cancer.

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