How the drug abemaciclib treats breast cancer

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The anti-cancer drug abemaciclib (also known as Vernezio) has been

added to the Australian Pharmaceutical Benefits Scheme (PBS) to treat certain types of breast cancer.

This significantly reduces the cost of the drug. A patient can now expect to pay A$31.60 for a 28-day supply ($7.70 with a health care concession card). The price of abemaciclib without government subsidy is $4,250.

So what is abemaciclib, and how did we get to this point?

It stops cells dividing

Researchers at the pharmaceutical company Eli Lilly developed abemaciclib and published the first study on the drug (then known as LY2835219) in 2014.

Abemaciclib is a type of drug known as a "cyclin-dependent kinase inhibitor." It's taken as a pill twice a day.

To maintain our health, many of the cells in our bodies need to grow and divide to produce new cells. Cancers develop when cells grow and divide out of control. Therefore, stopping cells from dividing into new cells is one way that cancer can be fought.

When cells divide, they have to make a copy of their DNA to pass onto the new cell. "Cyclin-dependent kinases" (CDKs for short) are essential for this process. So, if you stop the CDKs, you stop the DNA copying, you stop cells dividing, and you fight the cancer.

However, there are different types of CDKs, and not all cancers need them all to grow. Abemaciclib specifically targets CDK4 and CDK6. Thankfully, a lot of cancers do need these CDKs, including some breast

cancers.

But abemaciclib will only be effective against cancers that rely on CDK4 and CDK6 for continued growth. This specificity also means abemaciclib is fairly unique, so it can't easily be replaced with a different drug.

Two other CDK4/6 inhibitors were developed around the same time as abemaciclib, and are called ribociclib and palbociclib. Both of these drugs are also on the PBS for specific types of breast cancer. As the drugs differ in their chemical structures, they have slight differences in the way they are taken up and processed by the body. The preferred drug given to a breast cancer patient will depend on their unique circumstances.

What are the side effects?

Research is still ongoing into the differences between each of these CDK4/6 inhibitors, but it is known that the side effects are largely similar, but can differ in severity.

The most common side effects of abemaciclib are fatigue, diarrhea and neutropenia (reduced white blood cells). The gastrointestinal issues are generally more severe with abemaciclib.

If these side effects are too severe, abemaciclib treatment can be stopped.

What types of cancer has abemaciclib been approved for?

In 2017, the United States Food and Drug Administration (FDA)

approved abemaciclib for the treatment of patients with metastatic HR+/HER2- (hormone receptor-positive and human epidermal growth factor receptor 2-negative) breast cancer who did not respond to standard endocrine therapy.

Australia's Therapeutic Goods Administration (TGA) similarly approved abemaciclib in 2022 as an "adjuvant" therapy (after the initial surgery to remove the tumor) for patients with HR+/HER2- invasive early breast cancer which had spread to lymph nodes and was at high risk of returning.

As of May 1 2024, the PBS covers this use of abemaciclib in combination with endocrine therapy such as fulvestrant, which is also listed on the PBS. Endocrine therapy, also known as hormonal therapy, blocks hormone receptor positive (HR+) cancers from receiving the hormones they need to survive.

Could abemaciclib be used for other cancers in the future?

Abemaciclib is of great interest to scientists and medical practitioners, and testing is ongoing to assess the effectiveness of abemaciclib in treating a range of other cancers, including gastrointestinal cancers and blood cancers.

Abemaciclib may even be usable in brain cancers, as it has long been known to be capable of crossing the blood-brain barrier, a common stumbling block for potential anti-cancer drugs.

Time will tell whether the role of abemaciclib in health care will be expanded. But for now, its inclusion on the PBS is sure to bring some relief to breast cancer patients nationwide.