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Can Dopamine Treat Breast Cancer?

Analysis by Dr. Joseph Mercola | October 16, 2024

STORY AT-A-GLANCE

- Dopamine and progesterone have therapeutic effects against cancer, while estrogen and serotonin promote cancer growth and spread
- Selegiline, an antidepressant that belongs to a class of drugs called monoamine oxidase (MAO) inhibitors, might be effective as an anticancer therapeutic for breast cancer
- Selegiline works by inhibiting monoamine oxidase B (MAO-B), which increases dopamine levels in the brain
- Lifestyle factors like exercise, sleep, diet and stress management naturally increase dopamine levels
- Reducing exposure to the known human carcinogen estrogen and lowering your estrogen load are also important anticancer strategies

Recent research has uncovered an intriguing link between certain hormones and neurotransmitters and breast cancer treatment. This connection involves four key players: estrogen, serotonin, dopamine and progesterone. Each of these substances plays a crucial role in various bodily functions, but their impact on cancer growth and treatment is now coming into sharper focus.

Estrogen, primarily known as a female sex hormone, regulates reproductive processes, bone density and cardiovascular health. However, it's also recognized for its ability to promote cancer growth. Many breast cancers, for instance, are classified as estrogen-receptor positive, meaning they grow in response to estrogen.

Serotonin, often misleadingly called the "feel-good" neurotransmitter, is an antimetabolite, meaning it suppresses your body's ability to create energy in the electron transport chain of your mitochondria. Recent studies suggest serotonin also stimulates the growth and spread of cancer cells.[1]

On the other hand, dopamine, another neurotransmitter, is showing promise in cancer treatment. Typically associated with pleasure, motivation and reward systems in your brain, dopamine is being investigated for its anticancer properties. Research indicates that it may help inhibit tumor growth and enhance the effectiveness of certain cancer treatments.[2]

Progesterone, another sex hormone crucial for reproductive health and pregnancy, is also emerging as an ally in cancer treatment, because it's not only anti-estrogen but also inhibits cortisol and improves mitochondrial production of cellular energy by blocking estrogen and cortisol.

Dopamine's Cancer-Fighting Potential

A study published in Applied Sciences examined how drugs that affect dopamine and serotonin receptors could improve the effectiveness of standard chemotherapy drugs like paclitaxel when used together.[3]

The researchers tested several repurposed drugs that act on dopamine and serotonin pathways, looking for those that could reduce breast cancer cell viability. Two drugs showed particular promise — benztropine and thioridazine.

Benztropine is typically used to treat Parkinson's disease, while thioridazine is an antipsychotic medication. When combined with paclitaxel, both of these dopamine-targeting drugs demonstrated a synergistic effect, meaning they enhanced paclitaxel's ability to kill breast cancer cells beyond what either drug could do alone.

The study found benztropine and thioridazine were able to reduce breast cancer cell viability on their own, even without paclitaxel. This suggests these dopamine-modulating drugs have inherent anticancer properties.

Importantly, benztropine and thioridazine target different pathways than standard chemotherapy drugs. They may help overcome chemotherapy resistance and attack cancer through multiple mechanisms. Some research indicates they even target elusive cancer stem cells that often evade conventional treatments.

While dopamine shows promise for fighting cancer, the study results suggest serotonin may play a more harmful role.[4] Drugs that increase serotonin activity or block its reuptake did not demonstrate anticancer effects in this research. In fact, some evidence indicates serotonin may stimulate cancer cell growth and proliferation.[5] As bioenergetic researcher Georgi Dinkov explains:[6]

> *"I discovered a multitude of studies demonstrating serotonin (5-HT) is both a cause and promoter of cancer, and that dopamine activates the progesterone receptors … with the final conclusion being that estrogen/serotonin cause and promote cancer, while progesterone/dopamine are therapeutic."*

Understanding Dopamine's Anticancer Mechanisms

The study's findings provide compelling evidence for dopamine's cancer-fighting abilities. While the exact mechanisms are still being investigated, several factors contribute to dopamine's potential as an anticancer agent:[7]

1. **Direct tumor suppression —** The study showed that dopamine-modulating drugs like benztropine and thioridazine could reduce breast cancer cell viability on their own. This suggests that increasing dopamine activity may directly inhibit tumor growth.

2. **Targeting multiple pathways —** Dopamine-modulating drugs affect cancer cells through different mechanisms than conventional chemotherapy. This multi-pronged approach could help overcome drug resistance, a common problem in cancer treatment.

3. **Affecting cancer stem cells —** Some research indicates that dopamine-targeting drugs may be effective against cancer stem cells, which are often resistant to

conventional treatments and lead to cancer recurrence.

4. **Counteracting serotonin's effects —** Given that serotonin may promote cancer growth, dopamine's anticancer properties could be partly due to its ability to balance or counteract serotonin's effects in your body.

These findings suggest that dopamine plays a more complex role in cancer biology than previously thought. By leveraging dopamine's cancer-fighting abilities, researchers may be able to develop more effective and less toxic cancer treatments in the future. However, more research, including animal studies and human clinical trials, is needed to fully understand and harness dopamine's anticancer potential.

Expanding on Dopamine's Role in Fighting Cancer

While the previous study discussed benztropine and thioridazine, another drug has also shown promising results in this field. Selegiline, also known as L-deprenyl, is an antidepressant that belongs to a class of drugs called monoamine oxidase (MAO) inhibitors.[8]

A study conducted by Indian researchers found that selegiline might be effective as an anticancer therapeutic for breast cancer.[9] What's particularly exciting about this finding is that selegiline was effective against various types of breast cancer cells, including the notoriously difficult-to-treat triple-negative breast cancer (TNBC).

Selegiline works by inhibiting monoamine oxidase B (MAO-B), which increases dopamine levels in the brain. Selegiline induces cell death in cancer cells through pathways that don't rely on reactive oxygen species (ROS). This is significant because many conventional cancer treatments focus on increasing ROS to kill cancer cells, but this approach also damages healthy cells.

While selegiline is a prescription drug, there are natural compounds that may have similar effects. Naphthoquinones, such as vitamin K, and eugenol, the main constituent of clove oil, have been shown to be potent and selective MAO-B inhibitors.[10]

These findings, along with the earlier research on benztropine and thioridazine, paint a compelling picture of dopamine's role in cancer biology. They suggest that maintaining healthy dopamine function in your body could be a valuable part of a holistic cancer prevention strategy.

The research on dopamine's role in cancer treatment opens up exciting possibilities not just for breast cancer but for other types of cancer as well. The fact that dopamine-modulating drugs have shown effectiveness against different breast cancer subtypes suggests that this approach might be applicable to a wide range of cancers.

Furthermore, this research underscores the complex interplay between neurotransmitters and cancer biology. It highlights the need for a more holistic approach to cancer treatment and prevention, one that considers not just the cancer cells themselves, but also the broader physiological context in which they develop and grow. Dinkov adds:[11]

> *"… All in all, the evidence continues to accumulate that pro-metabolic, anti-estrogenic, anti-serotonin, progestogenic and dopaminergic pathways are highly beneficial not only for a large number of very serious degenerative conditions, but they make one slim, happy, frisky (due to the antiprolactin effects) and long-living.*
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> *And since estrogenic (PUFA, birth control, endocrine disruptors, etc.) and serotonergic (SSRI) substances functionally approximately opposite to selegiline, you can imagine what their effects are."*

Natural Dopamine in Cancer Prevention

While the Applied Sciences study focused on pharmaceutical drugs that modulate dopamine, it raises intriguing questions about the role of your body's natural dopamine in cancer prevention and treatment. Could boosting your dopamine levels naturally help lower your cancer risk?

The study's findings suggest that increased dopamine activity may indeed have anticancer effects. Your body produces dopamine naturally, and there are several ways to increase your dopamine levels without medication:

Exercise — Regular physical activity has been shown to boost dopamine production and release in your brain.	**Sleep —** Getting adequate, quality sleep helps regulate your body's dopamine systems.
Diet — Consuming foods rich in tyrosine, a precursor to dopamine, may help. These include bananas, beef, eggs and green tea.	**Sunlight exposure —** Sunlight not only helps your body produce vitamin D but may also increase dopamine levels.
Music — Listening to music you enjoy has been linked to increased dopamine release in your brain.	**Meditation and stress reduction —** Chronic stress depletes dopamine, while meditation and other stress-reduction techniques may help maintain healthy levels.

Estrogen Is a Known Human Carcinogen

Estrogen's carcinogenic properties are well-established. The Women's Health Initiative (WHI) studies, which began in 1991,[12] showed estrogen replacement therapy in menopausal women significantly increased the risk of breast cancer and cancer of all female reproductive organs, as well as raising the risk of heart attacks, strokes, dementia and Parkinson's disease.

The publication of the WHI results led to a significant decline in estrogen replacement therapy, starting in the late 1990s, early 2000s, until about 2015, when studies refuting those earlier results started coming out. Scientists argued estrogen could be safely used if dosed and timed better. Cancer rates don't bear that out though.

The biochemical role of estrogen is to support wound healing. In cases of tissue trauma, estrogen reverts the differentiated cells in that specific tissue back to a stem cell-like condition, to repair the damaged tissue. In young, healthy women, progesterone turns off estrogen's activity. Progesterone declines with age, but estrogen synthesis typically does not. Hence, if your estrogen is high and progesterone low, your cancer risk will rise.

Progesterone is the antidote because it is not only anti-estrogen but also inhibits cortisol and will improve mitochondria production of cellular energy by blocking estrogen and cortisol. Detailed information on how to use progesterone is below, but additional commonsense strategies to help you limit your estrogen exposure and lower your estrogen load include:

Avoid synthetic estrogens — Minimize exposure to synthetic estrogens, such as those found in hormone replacement therapy and oral contraceptives. Consult with a qualified health care professional about alternative treatments and/or contraceptive methods with lower estrogen content.

Avoid endocrine-disrupting chemicals (EDCs) — Exposure to EDCs from sources like microplastics is over activating your estrogen receptors. To reduce your exposure, filter your drinking water, swap plastic bags, bottles, straws, utensils and food containers for non-plastic options and choose food with minimal natural packaging or glass packaging instead of plastic.

Avoid linoleic acid (LA) — Omega-6 polyunsaturated fats (PUFAs) like LA functions very similarly to estrogen as they both increase your risk for cancer and decrease metabolic function. Read my comprehensive LA article for more details.

Choose natural products — Opt for natural and organic personal care products, including makeup, skin care and hair care items, to reduce exposure to synthetic chemicals like parabens and phthalates, which have estrogenic properties.

Limit pesticide exposure — Choose organic produce whenever possible to reduce exposure to pesticides, many of which have estrogenic effects. Washing fruits and

vegetables thoroughly helps remove pesticide residues.

Rethink your household products — Many household cleaning products, laundry detergents and air fresheners contain chemicals with estrogenic properties. Swap them out for natural, nontoxic alternatives or make your own cleaning solutions using vinegar, baking soda and essential oils instead.

Avoid plastic containers — Minimize the use of plastic containers and food packaging, which leach estrogenic compounds into food and beverages. Instead, opt for glass or stainless steel containers for food storage and water bottles.

Maintain a healthy weight — Aim for a healthy weight and body composition through a balanced diet and regular exercise. Excess body fat, particularly around your thighs, hips and buttocks, contributes to higher estrogen levels.

Support liver health — Support liver function, as your liver plays a crucial role in metabolizing and eliminating excess estrogen from your body. Eat a nutrient-rich diet, avoid alcohol consumption and consider incorporating liver-supporting herbs and supplements, such as milk thistle or dandelion root.

Promote hormonal balance — Explore natural approaches to promote hormonal balance, such as consuming cruciferous vegetables (such as broccoli, cauliflower and kale), which contain compounds that help support estrogen metabolism and detoxification.

Reduce stress — Manage stress through relaxation techniques like meditation, deep breathing exercises, yoga or spending time in nature. Chronic stress disrupts hormone balance, including estrogen levels, so prioritizing stress reduction is essential.

How to Use Progesterone

Before you consider using progesterone, it is important to understand that it is not a magic bullet, and that you get the most benefit by implementing a Bioenergetic diet approach that allows you to effectively burn glucose as your primary fuel without backing up electrons in your mitochondria that reduces your energy production. My new book, “Your Guide to Cellular Health: Unlocking the Science of Longevity and Joy” comes out very soon and covers this process in great detail.

Once you have dialed in your diet, an effective strategy that can help counteract estrogen excess is to take transmucosal progesterone (i.e., applied to your gums, not oral or transdermal), which is a natural estrogen antagonist. Progesterone is one of only four hormones I believe many adults can benefit from. (The other three are thyroid hormone T3, DHEA and pregnenolone.)

I do not recommend transdermal progesterone, as your skin expresses high levels of 5-alpha reductase enzyme, which causes a significant portion of the progesterone you're taking to be irreversibly converted primarily into allopregnanolone and cannot be converted back into progesterone.

Ideal Way to Administer Progesterone

Please note that when progesterone is used transmucosally on your gums as I advise, the FDA believes that somehow converts it into a drug and prohibits any company from advising that on its label. This is why companies like Health Natura promotes their progesterone products as "topical."

However, please understand that it is perfectly legal for any physician to recommend an off-label indication for a drug to their patient. In this case, progesterone is a natural hormone and not a drug and is very safe even in high doses. This is unlike synthetic progesterone called progestins that are used by drug companies, but frequently, and incorrectly, referred.

Dr. Ray Peat has done the seminal work in progesterone and probably was the world's greatest expert on progesterone. He wrote his Ph.D. on estrogen in 1982 and spent most

of his professional career documenting the need to counteract the dangers of excess estrogen with low LA diets and transmucosal progesterone supplementation.

He determined that most solvents do not dissolve progesterone well and discovered that vitamin E is the best solvent to optimally provide progesterone in your tissue. Vitamin E also protects you against damage from LA. You just need to be very careful about which vitamin E you use as most supplemental vitamin E on the market is worse than worthless and will cause you harm not benefit.

It is imperative to avoid using any synthetic vitamin E (alpha tocopherol acetate — the acetate indicates that it's synthetic). Natural vitamin E will be labeled "d alpha tocopherol." This is the pure D isomer, which is what your body can use.

There are also other vitamin E isomers, and you want the complete spectrum of tocopherols and tocotrienols, specifically the beta, gamma, and delta types, in the effective D isomer. As an example of an ideal vitamin E, you can look at the label on our vitamin E in our store. You can use any brand that has a similar label.

You can purchase pharmaceutical grade bioidentical progesterone as Progesterone Powder, Bioidentical Micronized Powder, 10 grams for about $40 on many online stores like Amazon. That is nearly a year's supply, depending on the dose you choose.

However, you will need to purchase some small stainless steel measuring spoons as you will need a 1/64 tsp, which is 25 mg and a 1/32 tsp, which is 50 mg. A normal dose is typically 25-50 mg and is taken 30 minutes before bed, as it has an anti-cortisol function and will increase GABA levels for a good night's sleep.

Unfortunately, this vendor frequently runs out of product, and if that’s the case, then you can use **Simply Progesterone by Health Natura**. It’s premixed with vitamin E and MCT oil. Again, while Health Natura states that its product is for “topical use only,” I recommend applying it transmucosally, by rubbing it on your gums.

If you are a menstruating woman, you should take the progesterone during the luteal phase or the last half of your cycle, which can be determined by starting 10 days after

the first day of your period and stopping the progesterone when your period starts.

If you are a male or non-menstruating woman, you can take the progesterone every day for four to six months and then cycle off for one week. The best time of day to take progesterone is 30 minutes before bed as it has an anti-cortisol function and will increase GABA levels for a good night's sleep.

This is what I have been personally doing for over a year with very good results. I am a physician so do not have any problems doing this. If you aren't a physician, you should consult one before using this therapy, as transmucosal progesterone therapy requires a doctor's prescription.

Sources and References

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