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### Next Generation Diagnostic Pathology Using Digital Pathology and Artificial Intelligence (AI) Tools to Augment a Pathological Diagnosis

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#### Abstract

Approximately 850,000 American women are diagnosed with the dreaded word cancer every year, while two-thirds of cancer deaths in the country are preventable. Although different types of cancer are worrisome, experts say that more than worrying, one should look for ways to control and prevent them, which are also readily available.

**Keywords:** Cancer; Cells; Tissues; Tumors; Prevention; Prognosis; Diagnosis; Imaging; Screening; Treatment; Management

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#### Introduction

Estrogen has been shown to affect the progression of breast cancer, and there is strong evidence that other hormones, such as androgens, may play a role. According to the World Health Organization, 2.3 million women will have breast cancer in 2020. Aside from skin cancer, breast cancer is the most common cancer in women in the United States. Every year, 3,600 women in the United States develop breast cancer, and most of them

receive hormone therapy. Patients may respond differently to hormone therapy, some of which respond more positively than others. This study analyzed patients' hormonal characteristics to provide a deeper understanding of how breast cancer cells respond to different hormones and why patients respond differently to hormone therapy. This study showed that hormone profiles before and after treatment play an important role in treatment success. This finding paves the way for further studies in larger patient groups to improve the success

rate associated with breast cancer treatment. Hormones are powerful signaling molecules that play an important role in helping our bodies function normally and respond to the world around them. We have known for over 100 years that estrogens are involved in the development of breast cancer and that many common medications are prescribed for treatment. Unfortunately, not all patients respond to these drugs, and we need a better way to determine the response to this type of treatment. By examining each person's tumor hormone levels, there is a better difference between those who respond to hormone therapy and those who do not, and potentially enables us to make more informed decisions about treatment options for patients [1-490].

## Results and Discussion

**Colorectal cancer:** This type of cancer is growing in men and women every year, according to the American Cancer Society. The good news is that colon cancer is completely preventable through regular colonoscopic screening. This test should be performed from the age of 50 onwards and repeated every 10 years. Colonoscopy is not only used to diagnose colon cancer, but can also identify and remove colon polyps before they become cancerous. Other screening options include a secret stool blood test.

**Thyroid cancer:** The chances of getting this cancer have doubled in the last 20 years, and women are twice as likely as men to get it, but there is no reason to be afraid. Fortunately, the diagnosis of thyroid cancer is easy and very effective. Because the disease progresses slowly, even in severe cases, there is usually no serious progression of the disease and treatment is usually effective. Regardless of the anaplastic types of thyroid cancer, which are very rare, thyroid cancer is rarely fatal. Overall, 97% of people with thyroid cancer will respond to treatment. See your doctor if you have any problems with swallowing, breathing problems, hoarseness or change in voice, frequent coughs, pain in the neck and

throat, and swelling in the lymph nodes. In most cases, thyroid surgery will be necessary to treat thyroid cancer. Of course, the choice of surgery and other treatment options depends on the type of disease and the severity of its progression.

**Endometrial cancer:** This type of cancer, called cervical cancer, especially affects postmenopausal women and starts on average from the age of 60 onwards. Approximately 40% of cases of this disease are due to obesity and overweight. Endometrial cancer also occurs due to overexposure to estrogen, high blood pressure and diabetes. The most important way to protect yourself against endometrial cancer is to control your weight. Exercise also has positive effects in this regard. Exercise can reduce high levels of estrogen, which can be dangerous to the body. High levels of the hormone estrogen in a woman's body can lead to uterine cancer. There is no effective screening test for endometrial cancer. Women at risk for endometrial cancer should be examined regularly by physicians. The risk group, in addition to overweight women, includes women who have had estrogen hormone therapy (without the use of progesterone) or women who have been taking tamoxifen for more than 2 years. Frequent pelvic exams, Pap smears, and uterine biopsies may be helpful in some cases.

**Lung cancer:** The incidence of lung cancer among women has increased by 98% over the past 4 decades, and this shocking statistic is due to the increase in the number of women smokers and women who are exposed to secondhand smoke. The only way to protect yourself from this cancer is to not smoke and to stay away from secondhand smoke. This method can increase the risk of lung cancer by up to 30%. If you are a former smoker or are exposed to secondhand smoke, ask your doctor about taking 325 mg of aspirin daily.

**Breast cancer:** One in eight women is at risk for breast cancer, and the good news is that thanks to the use of hormone therapy for menopausal symptoms, the risk of developing this cancer has decreased. Early detection of breast cancer increases the chance of survival by 100%.

Small breast cancers are less likely to spread to the lymph nodes, lungs, and brain. If you are 20 to 30 years old and do not have the risk factors for breast cancer, it is best to see your doctor every three years for a breast exam. To prevent breast cancer, women between the ages of 50 and 74 should have a breast mammogram every two years. Mammography can show a lump in the breast 3 years before the onset of cancer symptoms. But mammography does not completely prevent breast cancer.

## Conclusion

Digital pathology will not only increase the efficiency, speed and accuracy of diagnosis in identifying cancer patients, but will also enable the laboratory to use specialized software and special stains for cancer tissues to be able to find suitable patients for new anti-cancer treatments. Choose immunotherapy or target therapy.

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Ruthenium (VIII) Oxide ( $\text{RuO}_4$ ) Smart Nano Particles, Nano Capsules and Nanoclusters Influence, Impression and Efficacy in Cancer Prevention, Prognosis, Diagnosis, Imaging, Screening, Treatment and Management under Synchrotron and Synchrocyclotron Radiations. American Journal of Materials Engineering and Technology. 9: 1-20.

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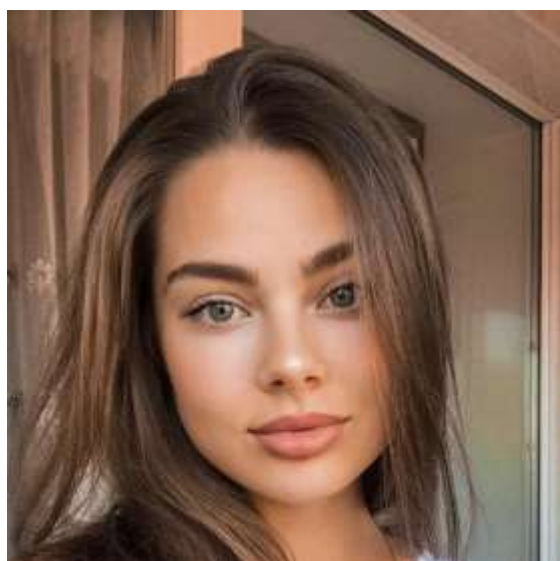
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