

Using artificial intelligence to hunt for breast cancer

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Endocrine disruptors (EDs) are hormone-like substances that can have undesirable effects on health. For example, chemicals can increase the risk of breast cancer if they act in a manner similar to the female sex hormone estrogen. Animal experiments are still required to detect the hormonal effects of chemical substances. A test has now been developed at the German Center for the Protection of Laboratory Animals (Bf3R) that tests the effects of hormones on cultured human cells.

The center is part of the German Federal Institute for Risk Assessment (BfR). With the help of microscopy and artificial intelligence, the "E-Morph" test reliably identifies substances that can have estrogen-like or even opposing effects, according to the research team's report in the specialist journal *Environment International*. "E-Morph is a milestone on the way to, one day, replacing [animal experiments](#) currently required to detect hormone-like effects," says BfR President Prof. Dr. Dr. Andreas Hensel.

The test is based on the observation that substances with an estrogen-like effect can loosen

the connection between cells in the mammary gland. This makes it easier for [breast cancer cells](#) to detach themselves from the tissue—a crucial step in the spreading (metastasis) of tumors. In the E-Morph test, a test substance is given to cultured human breast cancer cells. The cells are then examined to detect whether the cell contacts loosen as if under the influence of estrogen. This effect is easy to observe under the microscope and can be evaluated fully automated using [artificial intelligence](#). The robot-assisted test including evaluation is quick and enables many substances to be tested in short time. Potential future uses of the test include testing chemicals that have already been marketed as well as those that are about to be launched. The [test](#) can also be used to develop new drugs, improve [diagnostic tests](#) to detect breast cancer, and optimize therapies.

More information: Marja Kornhuber et al, The E-Morph Assay: Identification and characterization of environmental chemicals with estrogenic activity based on quantitative changes in cell-cell contact organization of breast cancer cells, *Environment International* (2021). [DOI: 10.1016/j.envint.2021.106411](#)

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