

# Israeli engineers build artificial device capable of detecting cancer in breath

April 21 2011, by Bob Yirka

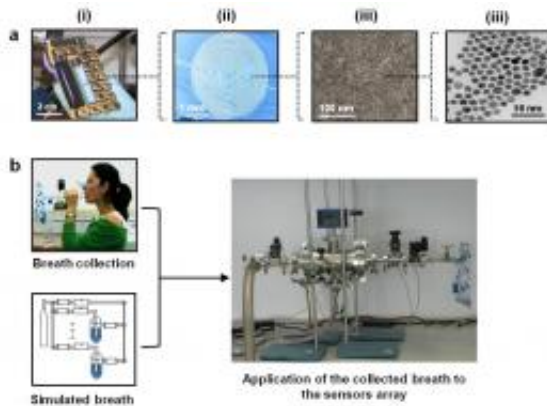


Illustration of the diagnosis of cancer via breath testing. Image credit: NPG, doi: 10.1038/bjc.2011.128

(PhysOrg.com) -- Professor Hossam Haick of the Israel Institute of Technology, at Technion, and his team have built an artificial nose which is capable of detecting molecules in human breath that signal the presence of head and neck cancers in people. In a paper published in the British Journal of Cancer, Haick describes how he and his colleagues set to work on coming up with a device that could mimic the ability that dogs have demonstrated in detecting certain types of cancers.

Such a device is critical for the millions of cancer victims the world over, as head and neck cancers are notoriously difficult to detect until they've reached an advanced stage when they are difficult to treat.

Called the Nanoscale [Artificial Nose](#) (NA-NOSE), by its developers, the device consists of five gold nanoparticle sensors and some imaginative software that is able to pick out and detect the patterns of [molecules](#) that exist in the breath of people with head, neck or even lung cancer. The sensors are so small, just a few of the molecules they're looking for can change the electrical properties of the materials, signaling a result, which means that they are capable of detecting very low concentrations of such compounds, which is critical due to the fact that human breath is 80% water vapor.

The NA-NOSE was tested using 80 volunteers, most of whom had various head and neck cancers, such as those of the mouth, lips, sinuses, larynx or salivary glands. Head and neck cancers comprise the eighth most common kind worldwide, and in some countries, such as the US, they can account for up to 5% of all cancer cases reported. Also included in the test were some patients with lung cancer. The NA-NOSE was able to discern the difference between patients with head and neck cancers versus those that were cancer free, between those who had head and neck cancers versus those who had lung cancer and between those who had [lung cancer](#) compared to those who were cancer free.

While the results of the test were clearly remarkable, the NA-NOSE still needs to go through much more rigorous testing before it will be deemed suitable for use as an actual diagnosis tool in doctor's offices around the world, but as Haick notes, so far, the results are very promising.

**More information:** Diagnosis of head-and-neck cancer from exhaled breath, *British Journal of Cancer* advance online publication 19 April 2011; [doi: 10.1038/bjc.2011.128](https://doi.org/10.1038/bjc.2011.128)

## Abstract

*background:* Head-and-neck cancer (HNC) is the eighth most common malignancy worldwide. It is often diagnosed late due to a lack of

screening methods and overall cure is achieved in

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