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Editorial
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Breathomics in Lung Cancer

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Editorial

Lung cancer (LC) is a major public health problem worldwide. Very often patients have their symptoms diagnosed at the later stages when the chances of survival are little. Moreover, at early stages, it cannot be detected due to the low presence of symptoms. The diagnosis of LC very often requires invasive techniques such as bronchoscopy, and that is why current investigation efforts are directing towards new tests for the early detection of LC. During the last few years the analysis of exhaled breath has been proposed as a novel option for an early detection of lung cancer [1].

In particular, progresses in sensor technology, biochemistry, electronics, and artificial intelligence has led to the possibility to create devices able of detecting and measuring the so-called volatile organic compounds (VOCs), which originate from human metabolism [2]. These tools, known as electronic noses, were manufactured to imitate mammalian olfaction by an instrument engineered to achieve reproducible measurements, permitting the analysis of VOC mixtures in almost every human matrix (i.e., blood, urine or breath) [2].

Electronic noses (e-noses) are appropriate for clinical purposes due to their flexibility, cheapness and quick output of results, ease of use and the broad spectrum of VOCs that may be analyzed. To date, several technologies have been used for projecting e-noses, each having its advantages, disadvantages and limitations [2].

The case of LC is particularly attention-grabbing because it is sustained by studies that have shown the correlation between the VOCs profile of breath and the disease.

To date, a number of sensor arrays have been used to test the ability of e-noses in the detection of LC. In detail, technologies such as quartz crystal microbalance [3-6], colorimetric sensor array [7], conducting polymers [8-11], surface acoustic wave-based array [12], gold nanoparticles [13], and even nanomaterial-based sensors [14] have successfully shown their capability in recognizing the exhaled breath of patients with LC from those without it.

Therefore, if properly validated [15], e-noses may become very useful devices for physicians in the diagnosis of LC. Their ideal use would be as screening tools, with high sensitivity to exclude LC and/or for choosing subjects for further more invasive diagnostics.

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