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Exploring the volatome of different cancer cell lines

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Abstract

As reported by the American Cancer Society, lung cancers have the highest death rate, compared to other types of cancer. The main reason is the lack of early stage non-invasive screening methods. Indeed, the death rate of the other most abundant cancers is decreasing due to the implementation of large-scale population screening techniques. It is believed that the death rate of lung cancer could be lowered by developing and implementing more efficient diagnostic methods¹.

A large number of diseases appear to have a volatile signature present in exhaled air. In practice, analytical breath profiling offers solutions for early detection of different kind of lung infections². For example, cystic fibrosis patients show a different volatile organic compound (VOC) profile because of the bacterial colonization that localizes in their lungs. A similar behavior is observed for patient suffering from lung cancer. However, the list of recognized volatile biomarkers of lung cancer is still scarce and could be improved. In spite of this, the biological variability of exhaled air profile makes the biomarkers identification challenging. In the hope of contributing to a better understanding, we used comprehensive two-dimensional gas chromatography coupled to time of light mass spectrometry (GC×GC-TOFMS) to investigate the headspace of cancer cells.

A procedure has been developed to sample cell culture headspace. After proper data treatment, univariate and multivariate statistics were compared for isolation of potential cancer biomarkers. Further tentative identification was also carried out by using high-accuracy MS analyzers as detection techniques.

1 Siegel, R. et al. Cancer statistics **2013** 2 Di Francesco, F. et al. *Microchemical Journal* **2005** .

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