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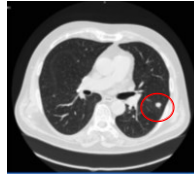Early diagnosis of lung cancer in the electronic nose: base on a system of analysis

R. Gasparri*, G. Sedda, J. Guarize, D. Brambilla, A. Borri, M. Santonico,
G. Pennazza, C. Di Natale, R. Paolesse, A. D'Amico, and L. Spaggiari.

Electronic Nose measurement

LCaos Second Workshop on Lung Cancer Detection with Sensor Arrays
September 18-19, 2014 – Palma de Majorca

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Introduction

▸ In 2012 WHO found out that lung cancer is the most common and most responsible of deaths annually (19.4%).

▸ Early detection of lung cancer is determinant to improve the survival.

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Aim

Analyze breath VOCs utilizing an electronic nose in order to obtain the fingerprint of lung cancer patients and healthy subjects.

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Electronic nose

▸ Developed by the group of Professor Arnaldo D'amico (Rome, Italy).

▸ Based on eight quartz crystal microbalance gas sensor

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Methods

- Prospective Study on 82 subjects volunteers with signed consent, each one older than 50 years.

- 47 patients with lung cancer with no previous history of cancer (within 5 years), no previous radio or chemotherapy.

- 35 healthy subjects with an X-rays or CT of the chest to prove the health status.

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Test Execution

Breath Collection

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Results

		EN		
		positive	negative	
histology	positive	41	6	Sensitivity= **87%**
	negative	11	24	Specificity= **69%**
		PPV=**79%**	NPV=**80%**	

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Discussion

These preliminary results are satisfactory and define the electronic nose as a promising tool for early diagnosis.

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Conclusions

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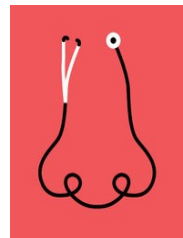
- ▶ We need to realize a robust model in order to transfer the instrument in the clinical practice.

- ▶ Further studies are necessary:
  - · Evaluate larger groups of patients.
  - · Investigate the different histology subgroups of non small cell lung cancer

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Future

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- ▶ Other types of cancer can be investigated with EN like cancer of the digestive tract (NK de Boer et al, 2014) or urinary (Finazzi-Agro E et al, 2014).

- ▶ Make the test more patient-friendly with the PNEUMOPIPE
  (European patent No. EP2641537 (A1) - 09/25/2013 owned by Eng. M. Santonico and Eng. G. Pennazza).

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Acknowledgements

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THANK YOU

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STOP CANCER

Thank you!

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