Dust. Pathologists never report the presence of a possible metal-related aetiology in a specimen by lack of available technology. Therefore, several respiratory diseases are considered idiopathic. We recently developed an all-optical method, fully compatible with standard microscopy systems, for multi-elemental imaging of biological tissues.

**Methods** Our instrument is based on Laser Induced Breakdown Spectroscopy (LIBS) and allows the *in situ* imaging and quantification of the elements of the periodic table within biological tissues. A laser is focused on the sample surface. Elemental images (maps) are obtained by scanning the surface of the specimen. Spectrometers collect the signal of various elements such as Fe-Ca-Na-P-Mg-Zn-Al-Mn-Co-Si-Cr-Ti and Cu in the tissue.

**Results** We identified and mapped the presence of high levels of Si and Al, but also Ti, or Cr in lung and mediastinal lymph nodes biopsies from exposed workers suffering from sarcoidosis or idiopathic pulmonary fibrosis. We found different elements including Lithium in the lymph node of a sarcoidosis patient working in a lithium-battery factory. We were also able to image the presence of Beryllium in the lungs of a patient with Chronic Beryllium Disease. As a matter of fact, Lithium and Beryllium are light-weight elements not detectable by any other elemental imaging technique. We will describe a panel of recent results obtained with LIBS, and confirmed with electron microscopy, focusing on respiratory diseases.

**Discussion** This laser spectrometry technique is versatile because almost any element can be imaged with high sensitivity. These results demonstrate the strong potential of this disruptive technology as a complementary tool for routine classical *in-situ* pathology examination of human tissues embedded in paraffin, especially for idiopathic respiratory diseases related to occupational or environmental exposure to metals, dust, or particles.

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**DISTRIBUTION OF SENSITIZER-INDUCED OCCUPATIONAL ASTHMA IN R. MACEDONIA IN THE PERIOD 2005–2016 BY OCCUPATION**

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**Introduction** Occupational asthma (OA) became an important public health problem worldwide in the last few decades. From two different OA types, sensitizer-induced OA accounts for approximately 90% of all OA cases.

**Objective** To present the distribution of sensitizer-induced OA by occupation in R. Macedonia in the period 2005–2016.

**Methods** Sensitizer-induced OA was diagnosed by serial measurements of peak expiratory flow rate (PEFR) at and away from work or by combination of serial PEFR measurements at and away from work and non-specific bronchal provocation at and away from work in subjects with diagnosed asthma and work-relatedness of the symptoms.

**Results** The annual incidence rate of the diagnosed sensitizer-induced OA in the mentioned period varied from 1.8/100,000 working population in 2013 to 2.8/100,000 in 2006. Sensitizer-induced OA in bakers, cleaners, textile workers and agricultural workers accounted up to more than a third of the all diagnosed cases. Atopy was registered in approximately a half of the sensitized-induced OA cases. Majority of the cases with sensitizer-induced OA caused by high-molecular-weight (HMW) agents (i.e. OA in bakers, textile workers, tanners, herbal and fruit tea processors, and health care workers) was atopics and had positive prick tests to occupational allergens.

**Conclusion** Our findings indicate the sectors with highest occurrence of sensitizer-induced OA in R. Macedonia in the period 2005–2016. The data obtained enable directing of adequate activities to prevent developing of the disease, as well as to identify affected workers and to prevent further respiratory impairment.