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UHASSELT
KNOWLEDGE IN ACTION

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To Whom It May Concern,

Current ambient outdoor air pollution is responsible for 4.2 million premature deaths worldwide and ranked within the top ten of important risk factors for public health. Children are especially vulnerable to the detrimental effects of air pollution and are more exposed compared to adults due to their higher respiratory rate and immature nature of their young organism. For instance, combustion-related particulate matter (PM) air pollution, including black carbon (BC), is associated in early life with lower birth weight, decreased cognitive function in children, impaired cognitive aging, increased cardiovascular morbidity and mortality as well as respiratory diseases and lung cancer in adult life.

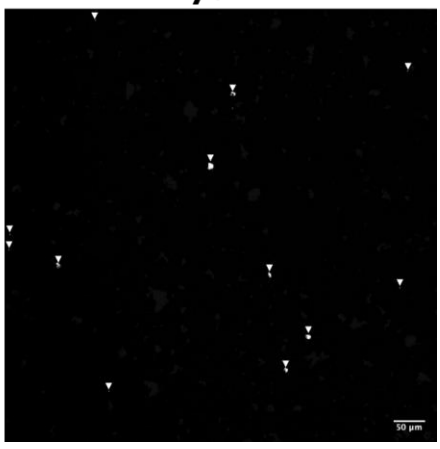
Moreover, the **EU Directive** 2008/50/EC recognizes that there is no identifiable threshold for PM exposure below which it would not pose a risk to human health and the IARC (WHO) 2013-recommendation identified the PM mixture as a group 1 carcinogen. Furthermore, evidence is accumulating that black carbon is one of the most toxic components within the air pollution mixture.

Hence, there **is a high societal need** for adequate internal exposure markers allowing reduction of exposure misclassification, which may lead to a better protection of the most vulnerable segments in society, such as children. We developed a method to measure black carbon particles in urine and we now tested for the first time ever black carbon particles in urine of children in Strasbourg and Rybnik (figure). Black carbon particles and aggregates (*arrowheads*) were visualized by femtosecond pulsed laser excitation at 810 nm and observation at 400–410 nm. We standardized for differences in urinary dilution by urinary osmolarity measurements.

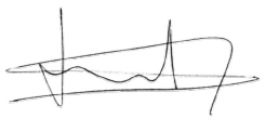
In general we observe a 3 to 9-fold higher carbon load in urine of children living in Rybnik compared with children living in Strasbourg. You can find below an example of urinary black carbon load a child living in Strasbourg (left) and right a child living in Rybnik.

Strasbourg

Rybnik



Sincerely Yours,



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