

Title: The interaction between pollution and other environmental measures on systemic lupus erythematosus

Synopsis:

Systemic Lupus Erythematosus is a chronic immune-mediated disease, associated with high morbidity and mortality. In women 15-24 YO lupus is the 7th cause of non-traumatic death, even more than sepsis, HIV or diabetes (1). It is well known that our genetic background determines the risk of developing this disease and shapes its manifestations, but other factors certainly contribute, including epigenetics. Interestingly, geographic factors are clearly important, since lupus is more frequent in urban than in rural areas (2,3). Another factor that affects disease activity is sun exposure. Patients are more frequently diagnosed in the summer and have more flares in this season. UV light exposure increases apoptosis and facilitates exposure of self-antigens, which may be recognized by stochastically generated auto-reactive immune cells. Air pollution contributes to the depletion of the ozone layer, which is crucial to absorb UVC radiation and a large amount of UVB radiation. We definitely need to know more between the connection between the environment and lupus.

We gathered a team of rheumatologists, immunologists, neuroscientists, bioinformatics and geographers to explore why the place where we live determines lupus activity.

We will use the database Reuma.pt to select patients with Systemic Lupus Erythematosus and we will analyze where they live, work and spend their leisure time. We will study the environment characteristics, namely the exposure to the air pollution – more specifically ambient particulate matter (PM) with several aerodynamic diameters ($\leq 2.5\mu\text{m}$, $\text{PM}_{2.5}$; $\leq 10\mu\text{m}$, PM_{10}), as well as some outdoor comfort measures (temperature, solar radiation and humidity). Disease activity will be evaluated using a validated clinical scale (SLEDAI-2k). The number of relapses and the treatment strategies used will be studied. The clinicians will collect all the demographic and clinical variables.

The specific tasks that the master student will develop include statistical analysis attempting to establishing links between the environmental data with the clinical data. It will also involve organization of the database to accommodate both types of data (clinical and nonclinical). For the environmental data, we will take advantage of the collaboration between the team members with the “Instituto de Geografia e Ordenamento do Território – Universidade de Lisboa”.

Our goal is to better understand how the environment shapes lupus activity in order to create strong foundations to better control this disease.

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