

The importance of protecting the lungs from oxidative stress for COPD patients

On World COPD Day, experts stress the importance of protecting the lungs from oxidative stress in people with chronic obstructive pulmonary disease.

Chronic obstructive pulmonary disease (COPD) is a chronic and progressive respiratory disease, highly disabling ¹. According to the World Health Organization², the Global Burden of Disease Study reports a prevalence of 251 million cases of COPD globally in 2016. It is estimated that 3.17 million deaths were caused globally by the disease in 2015 (this represents 5% of all deaths globally in that year). In the United States, the Centers for Disease Control and Prevention estimated that 16 million people have COPD.³

This disease affects between 8% and 12% of the adult population, generally people over the age of 35, especially men but is also increasing in women; diagnosis usually occurs around the age of 50.⁴ Smokers are most at risk: between 20% and 40% develop the disease. COPD tends to be progressive; it gets worse over time and those affected may have an important inflammatory reaction in response to an infectious agent or chemical-physical factors such as exposure to particles, fumes and irritating vapors (exacerbation)⁵.

Among the main causes of COPD exacerbations are viral infections⁶, which raise the oxidative stress and lead to an increase in pro-inflammatory molecules, starting a vicious circle that potentially aggravates the infection.^{7,8} Indeed, the oxidative stress is the basic condition of a series of chronic lung diseases and their exacerbations.

“A therapy with antioxidant drugs, restoring a balance between oxidizing agents and antioxidants, could protect the lungs from oxidative stress, which is also related to the inflammatory response, thus preventing exacerbations in COPD and other lung diseases,” explains Prof. Alberto Papi, Pneumological Clinic University Hospital S. Anna, University of Ferrara. “Some recent studies, carried out on over a thousand patients, have shown that regular intake of NAC, at sustained dosages, i.e. twice those used to exploit its

¹ Global Burden of Diseases (GBD)

² [https://www.who.int/en/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-\(copd\)](https://www.who.int/en/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-(copd))

³ <https://www.cdc.gov/copd/index.html>

⁴ <https://www.issalute.it/index.php/la-salute-dalla-a-alla-z-menu/b/bpco-broncopneumopatia-cronica-ostruttiva#:~:text=La%20BPCO%20%C3%A8%20una%20delle,causa%20di%20morte%20in%20Italia.>

⁵ http://www.salute.gov.it/portale/salute/p1_5.jsp?id=102&area=Malattie_dell_apparato_respiratorio

⁶ GOLD 2020

⁷ Papi A, Johnston SL. The FASEB Journal express article 10.1096/fj.02-0118fje. Published online October 4, 2002

⁸ Papi A, Contoli THE JOURNAL OF BIOLOGICAL CHEMISTRY VOL. 283, NO. 42, pp. 28595–28606, October 17, 2008

mucoytic action, is able to reduce the number of exacerbations, especially in patients with moderate and severe forms of COPD and after a consistent period of drug intake. With a prevention point of view, it may therefore be appropriate to switch from the occasional administration of NAC to the persistence of treatment. In addition,” concludes Prof. Papi, “a coverage with NAC throughout the winter gives an additional advantage to patients with lung diseases to defend themselves from viruses that arrive in the colder season. NAC should therefore be taken during the winter season as a background therapy for COPD, to prevent exacerbations”.

In turn, **Dr. Marc Miravittles, Pulmonologist and Senior Researcher at the Hospital Universitari Vall d'Hebron/ Vall d'Hebron Institut de Recerca (Barcelona-Spagna)**, states, *“Oxidative stress is involved in the pathogenesis of chronic obstructive respiratory diseases. Therefore NAC, which also acts as a precursor and booster of Glutathione synthesis (GSH), the most important among the antioxidants produced by the body, can be used to reduce it. This thesis is confirmed by the guidelines of the American College of Chest Physicians and Canadian Thoracic Society which recommend oral treatment with NAC to prevent acute exacerbations of COPD in patients with this moderate or severe disease. The guidelines of the European Respiratory Society and the American Thoracic Society,”* concluded Miravittles, *“also recommend treatment with an oral mucoytic such as NAC for patients with moderate or severe respiratory obstruction to prevent future exacerbations”.*

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