



Press Release - Science

Septic shock: nitric oxide beneficial after all

Ghent, 15 December 2009 - Scientists at VIB and Ghent University in Flanders, Belgium have found an unexpected ally for the treatment of septic shock, the major cause of death in intensive care units. By inducing the release of nitric oxide (NO) gas in mice with septic shock, researchers Anje Cauwels and Peter Brouckaert discovered that the animal's organs showed much less damage, while their chances of survival increased significantly. That's contrary to all expectations, since it is generally assumed that nitric oxide is responsible for the potentially lethal drop in blood pressure in septic shock.

Septic shock, or sepsis, is a medical condition in which acute inflammation, low blood pressure, and blood clotting cause a dangerous decrease in the delivery of blood to the organs. Because of the lack of oxygen, the patient's organs start to fail, one after the other. Currently, only supportive treatment is available.

It is generally assumed that nitric oxide (NO) gas is responsible for the hypotension and cardiovascular collapse in septic shock. Therefore, a lot of medical research is focused on combating NO, which is also a messenger molecule in the body. Attempts to inhibit its production paradoxically led to a worsening of the organ damage and in an increased lethality, both in animal models and in a clinical trial in sepsis patients. This led to the assumption that NO also has positive effects in sepsis, but up to now NO remained a prime suspect for the pathogenesis of the cardiovascular shock.

The team in Ghent is turning this paradigm upside-down in an article that will appear in *The Journal of Experimental Medicine* on Monday 21 December 2009. During their research, Cauwels and Brouckaert administered nitrite – a substance that releases NO – to mice with septic shock. The nitrite treatment, in sharp contrast with the worsening effect of inhibiting NO-synthesis, significantly attenuates hypothermia, mitochondrial damage, oxidative stress and dysfunction, tissue infarction, and mortality in mice. It is not yet known what mechanisms are at work behind this observation. That will be the subject of further research.

For now, not only is this discovery revolutionizing the way in which scientists view nitric oxide's role in septic shock – it also opens possibilities for treatment. Instead of trying to prevent the effects of NO, they should rather be imitated or reinforced to provide a solution for saving organs or particular parts of the body where there is a lack of oxygen due to septic shock.

Questions

Given that this research can raise a lot of questions, we ask you to please refer questions in your report or article to the e-mail address that VIB makes available for this purpose: patienteninfo@vib.be



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Relevant scientific publication

This research appears in the authoritative 'Journal of Experimental Medicine' (*Anje Cauwels et al., Nitrite protects against morbidity and mortality associated with TNF or LPS-induced shock in a soluble guanylate cyclase-dependent manner*).

Mention both VIB and the university

When reporting this research, please always mention VIB as well as the university concerned.

VIB

VIB is a non-profit research institute in life sciences in Flanders, Belgium. About 1200 scientists conduct strategic basic research on the molecular mechanisms that are responsible for the functioning of the human body, plants, and micro-organisms. Through a partnership with four Flemish universities – UGent, K.U.Leuven, University of Antwerp, and Vrije Universiteit Brussel – and a solid funding program, VIB unites the forces of 70 research groups in a single institute. Through its technology transfer activities, VIB strives to convert the research results into products for the benefit of consumers and patients. VIB develops and disseminates a wide range of scientifically substantiated information about all aspects of biotechnology. For more information, please visit www.vib.be.

Ghent University

After more than twenty years of uninterrupted growth, Ghent University is now one of the most important institutions of higher education and research in the Low Countries. Ghent University yearly attracts over 30,000 students, with a foreign student population of over 2,200 EU and non-EU citizens. Ghent University offers a broad range of study programmes in all academic and scientific branches. With a view to cooperation in research and community service, numerous research groups, centres and institutes have been founded over the years. More info www.UGent.be

Peter Brouckaert leads the research group 'Molecular Pathophysiology and Experimental Therapy' at the VIB Department for Molecular Biomedical Research, UGent

<http://www.vib.be/Research/EN/Research+Departments/Department+for+Molecular+Biomedical+research/Peter+Brouckaert/>

Financing

This research was funded by 'FWO-Vlaanderen' and het 'Bijzonder Onderzoeksfonds (BOF-GOA)' of the University of Ghent.