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ENGINEERING | **BIO TECH / HEALTH** | MATERIALS / ENERGY | GREEN / FOOD

Blood nitrosylated hemoglobin as biomarker of vascular disease

KEYWORDS

- Biomarkers
- Endothelial function
- Nitric Oxide bioavailability
- Erythrocytes

Technology Market:

Diagnostic / Endothelial function / Cardiovascular risk detection

There is an urgent need for a satisfying biomarker to improve risk stratification of patients with silent or patent vascular disease.

The quantitative measurement of nitric oxide bioavailability in vasculature as new biomarker of endothelial function will be useful for:

- Vascular endothelial dysfunction-related diseases
- Treatment tailoring and personalized medicine

The UCL invention

UCL researchers have set up and validated an efficient process to stabilize and quantify the product of reaction between hemoglobin and nitric oxide in erythrocytes *in vivo*. The paramagnetic α-HbNO complex is measured by Electron Paramagnetic Resonance (EPR) spectroscopy.

Technology Status

Measured α-HbNO levels were strongly correlated with endothelial function (Fig.1).

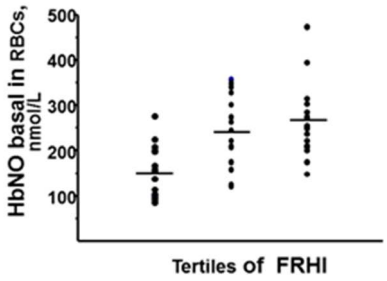

Fig.1. Concentration of α-HbNO correlated with the index of endothelial function (FRHI) measured by tonometry during reactive hyperemia. Results presented in tertiles of FRHI values for 50 healthy volunteers.

The test was clinically validated in cohorts of healthy volunteers or patients with metabolic syndrome (Fig.2). Significant correlations of α-HbNO levels were established with traditional cardiovascular risk factors, such as the Body Mass Index, levels of glycated hemoglobin, non-HDL cholesterol or triglycerides.

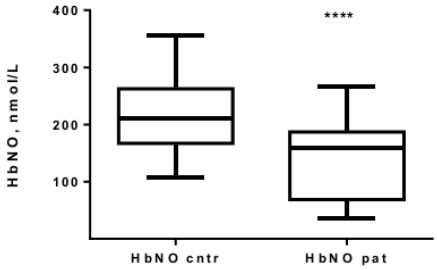

Fig.2. Analysis of α-HbNO levels in patients (N=44) versus healthy control group (N=38).

Advantages & applications

- ✓ Direct measurement of the bioavailability of NO, the main "guardian" of vascular homeostasis
- ✓ Direct and quantitative measurement of bioactive radicals
- ✓ Surrogate biomarker in interventional clinical studies to test efficacy of cardiovascular treatments
- ✓ Biomarker for treatment tailoring, e.g. to guide dosage of medications with vascular toxicity or NO donors

This work is patented: EP 11195797.3; US-2014-0336534-A

Relevant references

Lobysheva II, Biller P, Gallez B, Beauloye C, Balligand JL. PLoS One. 2013 8(10):e76457

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INTERESTED TO DEVELOP AND / OR COMMERCIALISE THIS TECHNOLOGY?

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