

# Diagnostic procedure for the determination of the Nox2 protein.

## KEYWORDS

- ❑ PLATELET ACTIVATION
- ❑ OXIDATIVE STRESS
- ❑ REACTIVE OXYGEN SPECIES (ROS)
- ❑ NADPH OXIDASE
- ❑ CARDIOVASCULAR DISEASE

## AREA

- ❑ CHEMISTRY & BIOTECHNOLOGY

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### Priority Number

n. 102017000141849 \_ 07.12.2017.

### Patent Type

Patent for invention.

### Ownership

Sapienza University of Rome 100%.

### Inventors

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### Industrial & Commercial Reference

Cardiovascular medicine and pathologies associated with increased oxidative stress.

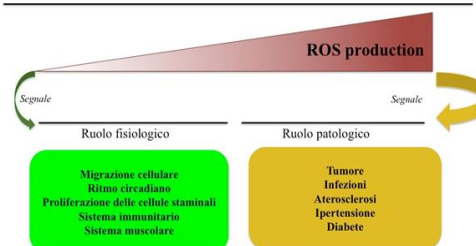
### Time to Market

The invention has passed both in vitro and in vivo study and is ready for the production of the ELISA kit for the determination of s-Nox2.

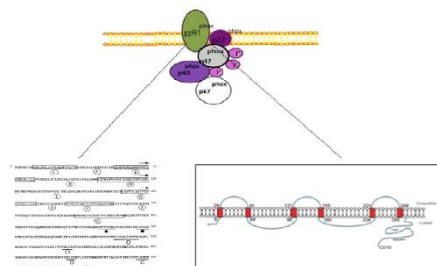
### Availability

Cession, Research, Development, Experimentation and Collaboration.

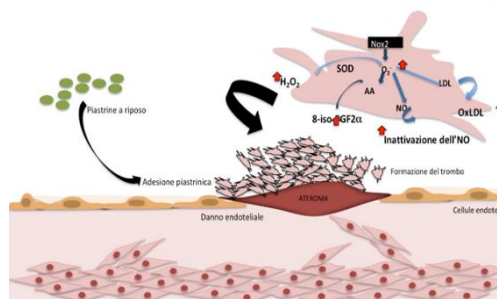
### Il ruolo biologico e fisiologico dei ROS: il buono, il brutto e il cattivo



### Struttura e sequenza della Nox2



### Ruolo ed attivazione della Nox2 durante il processo aterosclerotico



## Abstract

The enzyme NADPH oxidase, and in particular the Nox2 isoform, is one of the main cellular enzymes capable of generating reactive oxygen species (ROS).

Direct analysis of these molecular species is particularly difficult to perform because they are extremely reactive and have a very short half-life.

The aim of the present invention is to provide a diagnostic procedure for the quantitative detection of the Nox2 protein, which allows to effectively discriminate healthy subjects and sick subjects suffering from pathologies characterized by a high oxidative stress, and a high quantity of Nox2.

## Publications

There are a number of publications on the role of Nox2 in cardiovascular diseases and other diseases associated with oxidative stress.

- ❖ <https://www.ncbi.nlm.nih.gov/pubmed/?term=Nox2+oxidative+stress+in+cardiovascular+disease>



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# Diagnostic procedure for the determination of the Nox2 protein.

## Technical Description

The invention relates to a process for quantitative detection of the Nox2 protein and comprises:

- i) normalizing the protein content of the biological sample to a value of 1 µg of protein per 100 µl of sample;
- ii) incubate the sample with an anti-Nox2 monoclonal detection antibody, in which the detection antibody is directly conjugated with a detection marker;
- iii) detecting the formation of the Nox2-antibody detection complex.

For the realization of the invention need a kit consisting of:

- i) a solid phase for performing a diagnostic test;
- ii) an anti-Nox2 monoclonal detection antibody conjugated to a detection marker;
- iii) set of calibrators at known concentrations of the Nox2 protein;
- iv) instructions for use;
- v) buffer solution for sample dilution.

## Technologies & Advantages

There are many studies that identify the enzyme NADPH oxidase as the main cellular enzyme able to generate reactive oxygen species (ROS). NADPH oxidase family consists of 7 different isoforms such as Nox1, Nox2, Nox3, Nox4, Nox5 and DUOX 1 and 2. Among the different isoforms, Nox2 is the most studied. In recent years the role of ROS in blood circulation and their interaction with vessel tone modulation systems have received much interest from researchers working on the phenomenon of atherosclerosis.

The direct analysis of ROS is particularly difficult to perform because they are extremely reactive and their half-live as radicals is very short. The aim of the present invention is to provide an in vitro procedure to detect the Nox2 protein.

This method has been improved with respect to the previous one, described in US patent application US 2012/0156704.

The novelty of the invention consists of effectively discriminated against healthy subjects and sick subjects suffering from pathologies characterized by high oxidative stress, i.e. a high quantity of Nox2.

## Applications

This invention can be applied in the medical field as a diagnostic procedure that allows to perform a quantitative detection of the Nox2 protein contained in a biological sample.

This detection is very accurate and allows a correct discrimination between healthy subjects and sick subjects.

The quantitative analysis of the sNox2-dp peptide can be performed in subjects that are characterized by pathologies associated with a high oxidative stress such as metabolic diseases, for example diabetes, hypercholesterolemia, hyperlipidaemia, diseases affecting the cardiovascular system, such as arterial hypertension, atherosclerosis, cardiac hypertrophy, myocardial infarction, atrial fibrillation, and / or inflammatory diseases, such as rheumatoid arthritis, or sepsis.

The accurate determination of the level of oxidative stress in these subjects is particularly useful for monitoring the respective therapies in order to verify their effectiveness and / or correct the therapies themselves by increasing or decreasing the quantity of drugs administered.

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