

## FLUORESCENT SENSORS FOR THE HIGHLY SELECTIVE DETECTION OF NITRIC OXIDE

### DESCRIPTION OF THE INVENTION

Nitric oxide is a molecule that plays a significant biological role, as it is involved in cardiovascular, neurological and immune system processes, among many others. Detecting nitric oxide is therefore vital to understand numerous biochemical processes. Furthermore, it is known that various pathologies associated with nitric oxide (cancer, Alzheimer's disease, Parkinson's disease, epilepsy, and so on) could potentially be detected if levels of nitric oxide were identified in detail. The extent to which nitric oxide is present at the biological level (mainly, at the cellular level) is nowadays determined by using molecules known as fluorescent probes.

The organic molecules developed by Universitat Jaume I can interact efficiently with nitric oxide. The fluorescence of the synthesised molecules increases considerably when reacting with this analyte, but this is not so when the interaction occurs

with other related oxidising agents, such as peroxyxynitrite, nitrite, hypochlorite or hydrogen peroxide. The absence of any interference from dehydroascorbic acid (DHA), an interferent of great biological importance, is particularly interesting.

The synthesis of the molecules is highly versatile, and allows a wide spectral variety to be obtained in just two steps using products that are readily available in the market. This ease of synthesis makes it possible to offer a wide range of absorptions and emissions, depending on the substituents that are present in the structure of each probe. Such versatility is important when it comes to selecting the most appropriate molecule depending on the excitation source available (laser or another light source)

### SECTORS FOR COMMERCIAL APPLICATION

The invention is a valuable aid for the medical and pharmaceutical industry because nitric oxide is involved in various cellular biochemical processes and, therefore, linked to pathologies associated with them.

### TECHNICAL ADVANTAGES AND COMMERCIAL BENEFITS

The main advantages of the technology are:

- Great selectivity. The compounds are sensitive to nitric oxide (in an oxygenated medium), and no substantial interferences with other species, particularly DHA, have been observed, something which does occur with many nitric oxide probes used today.
- Greater range of excitation wavelengths. The molecules currently used to detect nitric oxide operate at wavelengths longer than 500 nm, but our invention allows excitation to take place in different ranges (below 500 nm), which cannot be reached by current commercial probes.
- Easy and efficient synthesis. The molecules developed are obtained using a simple procedure that allows a large amount of the product to be synthesized in just a few steps.

The development has one outstanding innovating aspect as compared to the probes known to date. The probes developed by Universitat Jaume I do not interact with DHA, and this represents a competitive advantage with respect to other known probes. The activity of most of the sensors described up to now is based on the presence of a specific molecular structure (called ortho-diamine). This structure is known to interact with DHA, which may sometimes yield false positives. The technology developed is not based on the ortho-diamine structure, so it does not present the problem mentioned above, and the new probes are therefore more reliable when it comes to detecting nitric oxide in situations in which DHA may be present (biological samples).

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### STAGE OF DEVELOPEMENT OF THE TECHNOLOGY

The laboratory phase involving the synthesis and characterisation of these complexes has finished and they can now be applied to the detection of nitric oxide under controlled lab conditions. At present we are seeking industrial partners to which we would transfer the molecules for their commercial exploitation or with whom we would carry out research and develop applications. For example, it would be interesting to undertake a series of preliminary tests at the cellular level to check for favourable behaviour in a biological medium (that is to say, tests allowing the identification and signalling of nitric oxide in living cells). Considering that the products are easy to synthesise and, above all, that only a tiny amount of them (micrograms) is needed for their application, production may be carried out in a very short period of time by any company that is already well established in the field of chemical sensors.

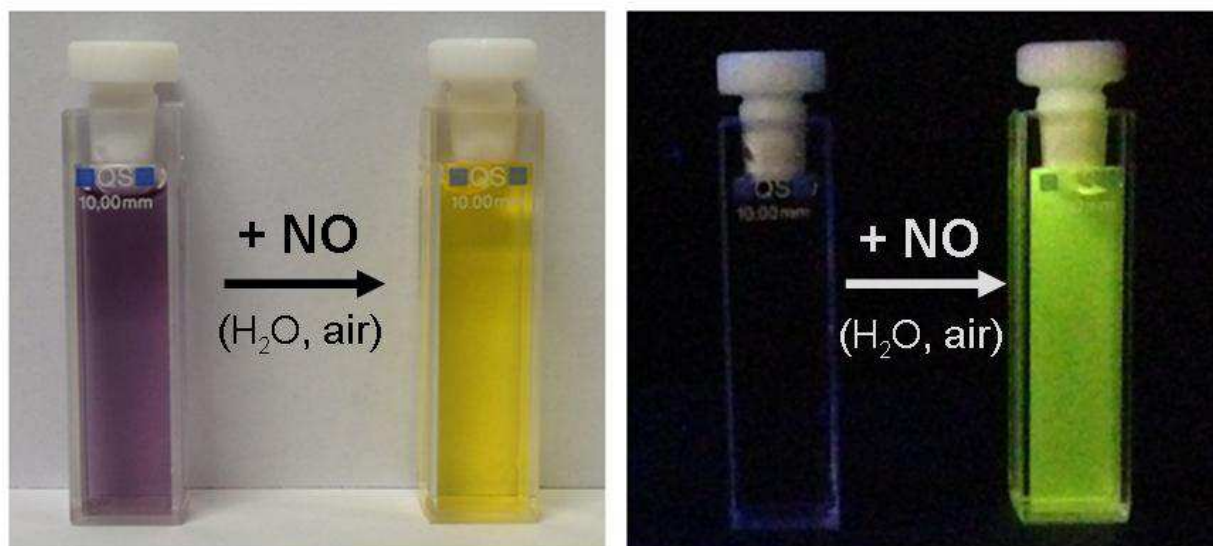
### INTELLECTUAL PROPERTY RIGHTS

A Spanish patent has been applied for with the reference P201330607 and filing date 04/25/2013. In process of internationalization by PCT.

### COLLABORATION SOUGHT

- License agreement for use, manufacturing or commercial exploitation.
- R&D for further development of the invention or for exploring its applications in other industrial sectors.

### RELATED IMAGES



### CONTACT DETAILS

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