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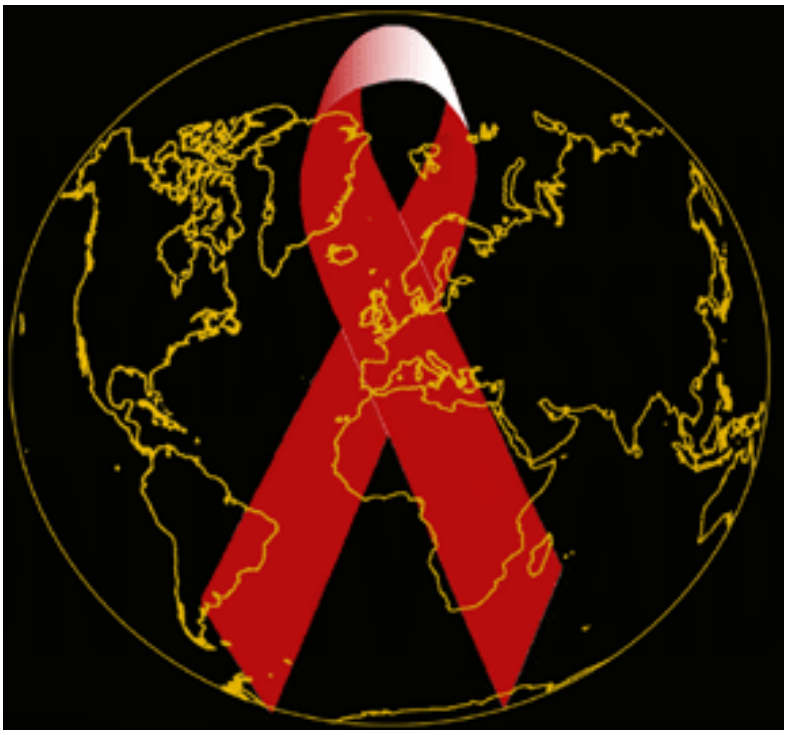
# A new marker to detect HIV



Researchers at the Institute of Biotechnology and Biomedicine at the UAB have managed to develop a new protein, called NF795gpC, which acts as a sensor when it comes into contact with the serum of a patient infected by HIV (Human Immunodeficiency Virus) and allows it to be easily detected.

In recent years, human immunodeficiency virus (HIV) has infected around 40 million people worldwide, causing the deaths of around 5 million annually. This has given rise to great scientific interest in this disease, mainly in the study of the immune response developed by the individual.

So far the number of CD4+ cells and the viral load (VL) have been used as the main markers of the progression of AIDS (Acquired Immunodeficiency Syndrome), but, day-by-day we are trying to find new useful markers. Knowledge of all the factors involved in the response will allow us, in

the future, both to develop effective vaccines and establish better control and treatment of these patients.

HIV is a virus, which consists of a lipid wrapping in which the glycoproteins, known as gp41 and gp120, and which are highly immunogenic and neutralitzable by the body's antibodies, are exposed. These are useful when we are trying to develop new reactions for the study and diagnosis of the diseases. In the present work, we have selected immunogenic fragments of the gp41 protein and these have been inserted into exposed zones, which are tolerant of insertions of the Escherichia coli enzyme b-galactosidase, generating the protein known as NF795gpC.

When the chemical protein NF795gpC comes into contact with anti-peptide gp41antibodies, we obtain a notable increase in the basal activity of the enzyme. This is observed as a colorimetric change in the enzymatic assay, due to the ability of b-galactosidase to hydrolyse sub layers which produce colour products. Hence, when we place the biosensor NF795gpC in contact with serum from a patient infected with HIV, we can easily detect that this person has been infected. The results of the assay are expressed as a reactivation factor of the protein, which corresponds to the percentage of the colour product produced by the enzymatic assay in the presence of antibodies compared to that generated in the absence of such antibodies.

We have studied the behaviour of the sensor in patients' serums and have correlated the activation signal with the types of antibodies present in the samples which recognise the viral peptides of the biosensor and also with some of the most widely used clinical parameters in the diagnosis of the disease, such as VL and the number of CD4+ i CD8+ cells.

Carrying out a statistical study of the lineal correlations between the sensor signal and each of the clinical parameters studied, we can see that the antibody IgG4 is most likely to activate the sensor. Hence, apart from being a new tool for the analysis of AIDS, it may provide more information on this type of antibody, as up to now we do not know very well what role it plays in the evolution of HIV infection.

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# References

Article: "High-throughput, functional screening of the anti-HIV-1 humoral response by an enzymatic nanosensor". Ferraz RM, Aris A, Martinez M, Villaverde A. /Mol Immunol/ 2006, May;43(13):2119-23.

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