Two new HIV vaccine candidates: Q&A with Nicolas Mouz

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European researchers have designed two new vaccine candidates to fight the HIV virus. These have been developed within the EU-funded project EURONEUT 41. They work by targeting the mechanism of HIV entry into the body via one of the virus' proteins, called gp41. Nicolas Mouz, chief scientific officer at project partner companyPX'Therapeutics, a Grenoble, France service organisation doing research and manufacturing, talks about the main challenges of dealing with the HIV virus in the fight against AIDS. His views stem from his experience with the project.

How do these vaccines design differ from similar work in the field?

In the project, we have used a combination of innovative approaches to try to obtain good immune responses. We have relied on protein engineering to design a good antigen—used to induce the immune response, mainly through generation of antibody by the body— as well as developing a specific vaccine formulation in a liposome—which is an artificial vesicle composed of a lipid bilayer—and a combination of routes of administration.

How did you manufacture this vaccine?

It is a vaccine based on gp41, which is one of the proteins located in the envelope of the HIV virus. gp41 is produced in a bacteria, called

Escherichia coli (*E. coli*), using so-called recombinant technology, which allows the creation the desired DNA sequence for the gp41 protein inside the production bacteria. After its purification, the gp41 protein is formulated into a liposome.

What are the results of the clinical trials so far?

The clinical trials for the first vaccine candidate started in December 2011. It was performed on 48 healthy women volunteers at the University of Surrey in the UK. We tested two routes of administration: a nasal route and an intra-muscular route. We reached the primary objective of the clinical trial. We showed that the vaccine is well tolerated and it is safe.

The second objective, demonstrating the capacity of these vaccines in triggering an immune response, also known as immunogenicity, was partially reached. Antibodies resulted from the vaccine, as expected. However, their inhibitory activities seem relatively weak. An exploratory phase is ongoing in order to quantify more precisely the neutralising activity of the immune response. The adjuvant, a component used to increase the immune response, was probably a limitation.

What is the next stage of the research?

Now we have been testing a second vaccine candidate in clinical trial. We have changed the adjuvant and used a classic one, namely a suspension of aluminium hydroxide gel. We hope that this vaccine could give more neutralising antibodies. The second candidate is also slightly different from the first. It is a variant of the gp41 protein and it is not formulated into a liposome. The trials started in May 2013, at the Royal Free London NHS Foundation Trust, in the UK. The final results are expected in April 2014.

We hope with the second vaccine candidate that the intra-muscular route of administration will give good immune responses. This means good antibody responses associated with neutralising activities.

What remains to be done once this project is completed next year?

If we have promising results, we will probably decide together with the project consortium and with other partners to launch the next clinical phase in order to test our vaccine candidate. The financing of the project will end at the end of next year. If we have a positive scenario, meaning interesting results, we will try to find a way to go on with this project. However, we are still a long way to have an efficient vaccine. The future HIV vaccine will be probably a combination of different vaccine subunits.

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