How rare models suggest new treatment strategies

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Elucidating the many possible causes of a rare auto-immune disease called Myasthenia Gravis could help point towards possible treatment for such disease.

Myasthenia Gravis (MG) is a rare auto-immune disease—whereby patients' immune systems attack their own bodies— arising from a breakdown in communications between the nervous and muscular systems. The immune system mistakenly makes antibodies that block signals in neuromuscular junctions, where nerve impulses are translated into physical actions. An EU-funded project is investigating the causes

of MG and ways to combat the disease. Here, Sonia Aknin-Berrih, project coordinator, who is also director of research in immunology leading a team on MG at INSERM, in Paris, France, talks to youris.com about her search for new treatments for MG.

How are patients with MG affected?

Muscles affected include those connected to the patients' eyes; they can no longer open their eyes correctly because the eye muscles are closed. MG also affects the legs and arms and patients experience fatigue. Sometimes the disease is even more severe when the respiratory muscles are affected and patients often need to go to hospital. Patients do not know when this respiratory crisis is going to hit and it makes them very anxious. MG affects their ability to do simple things like housework and many of them cannot work or lead a normal life.

What treatments exist already and what approaches are you taking develop new MG therapies?

There are treatments available to treat symptoms, but most have serious side effects. And because it is a chronic diseases, treatments have to be used over and over again, so there is a need to find better therapies.

As scientists, we try to better understand MG by finding and targeting the early events of the disease. We think an infection could be an early event in MG, but we do not know when that happens, which makes it is difficult to treat. We also see dysregulation of the immune system at different levels, so a therapeutic molecule that could act on the different problematic cells could be a very effective treatment.

Another treatment idea is to use stem cells that could target all the different cells of the immune system, which is more efficient than targeting only one kind. An alternative is to push immune system

defence cells, known as T-regulatory cells, to be more numerous and effective. These cells would normally down regulate over-active immunity but they are defective in MG patients. There are also some molecular options using monoclonal antibodies, and we have described many potential therapeutic targets.

Does the need for new MG therapies push you to be more innovative?

Yes, for sure. We are very much in contact with the patients' associations. We always keep in mind that they are waiting for new treatments. We have a responsibility—they count on us to find new therapies—so yes that makes us try to be more innovative. We are not only doing basic research, we also have contact with the patients. This helps us develop all kinds of models and test any hypothesis for potential treatment that looks interesting.

How soon could you have a treatment in clinical trials?

We have very good relevant models for testing potential treatments. Also, the molecules that we would like to use are already on the market. So if they are efficient in our model there is no reason not to try them on patients. I think that the first clinical trial could be done in less than 3 years. My research lab is in a very big hospital in Paris and we have a lot of collaboration with clinicians. Therefore, a clinical trial would be easy to organise because we already have access to over 1,000 MG patients.

I think we are in a good position and it should work, but you never know. Even if we meet all the conditions to have promising results, we have to test it to be sure.

More information: www.fight-mg.eu/