Max-Planck-Innovation

Technology Offer

Novel surface markers for diagnosis and vaccine against toxoplasmosis

File no.: MI-0401-4561-MG-ZE

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Background

Toxoplasmosis is the disease caused by infection with the parasite *Toxoplasma gondii*. A third to a half of the human population will have a toxoplasmosis infection at some point in their lives, however primary infections usually remain unnoticed due to absence or ambiguity of symptoms. After a first exposure to the parasite, a latent form of toxoplasmosis may remain in form of cysts in nervous and muscle tissues. While harmless for the majority of the population, latent toxoplasmosis in immuno-compromised individuals can lead to dangerous medical conditions such as toxoplasmic encephalitis, a severe inflammation of the brain. During pregnancy, primary infection with toxoplasmosis can cause transmission of the parasite from the mother to the unborn child, leading to mental and physical retardation and fetal death.
Diagnosis of acute toxoplasmosis relies on serological detection of IgG and IgM antibodies as well as determination of IgG avidity. IgM titers have the greatest diagnostic value, because absence of IgM antibodies can rule out a recently acquired infection. However, commercially available test kits are known to generate high rates of false positive test results. This will cause treatment of pregnant women with chemotherapies potentially harmful to the fetus. More reliable, faster and cheaper means of diagnosis for toxoplasmosis are highly desirable. A vaccine against toxoplasmosis is not available so far.

Technology

Researchers from the Max-Planck-Institute of Colloids and Interfaces in Potsdam identified unique surface markers that can be used for diagnosis of acute and latent toxoplasmosis (1). These surface markers are specific Glycosylphosphatidylinositols (GPIs). GPIs are complex glycolipids found at the plasma membrane of all eukaryotic cells.
Because the GPI composition of any living cell is highly heterogenous, the researchers employed chemical synthesis to obtain GPIs of the desired structure with high fidelity and high purity. The GPIs were fused to a solid support to allow the generation of carbohydrate microarrays as a diagnostic tool. With this tool at hand, the researchers succeeded in faithfully discriminating between sera of infected and non-infected individuals as well as between sera of acute and latent toxoplasmosis patients. Moreover, because of their high selectivity and purity, the synthesized molecules can be used as antigens for vaccination strategies.

We are looking for a licensing partner for the further development of this exciting technology.

Patent Information: A European priority application has been filed in July 2012. The pending patent is currently under examination in Europe and in the US.

Literature: (1) Götze, S. et al., Angew Chem Int Ed Engl. 2014 Dec 8;53(50):13701-5. doi: 10.1002/anie.201406706.