Turning a toxoplasma protein into a tool against infection

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Toxoplasmosis is a parasitic disease that most severely affects people with a weakened immune system. Caused by the parasite Toxoplasma gondii, it spreads due to consumption of undercooked meat and exposure to cat faeces. Credit: Kateryna Kon / 123rf

Toxoplasmosis is a parasitic disease that most severely affects people

with a weakened immune system. Caused by the parasite Toxoplasma gondii, it spreads due to consumption of undercooked meat and exposure to cat faeces. Although it can be mild, causing only flu-like symptoms, it can lead to brain problems such as lesions and encephalitis, in addition to other neurological disorders. It is not generally spread between humans, but can be passed to an unborn child if a pregnant woman is infected.

Current treatment options for toxoplasmosis are limited. Yee-Ling Lau and colleagues at the University of Malaya wanted to investigate potential vaccine candidates to prevent infection.

T. gondii invades cells with the help of a protein, ROP1, which is secreted within the parasite. The team looked at whether exposure to this protein could protect mice that were later infected with T. gondii. Past studies have shown that ROP1 does create some immune reaction in cell cultures and in animals, but until now, no one has gone on to infect vaccinated mice with live parasites to test the effectiveness of the immune response.

Lau and colleagues took groups of mice and gave them three vaccinations at twoweek intervals. Some received a ROP1 treatment intramuscularly or under the skin, while others received a placebo using the same two injection techniques. Each group of mice was later given lethal doses of a virulent T. gondii strain.

The mice that had received the ROP1 treatment survived longer than the controls, regardless of the method of vaccination. The vaccinated mice survived up to 16 days, whereas the controls all succumbed to T. gondii infection after just nine. The researchers caution, however, that none of the vaccinated mice had complete protection.

The team believes that the protection occurs through cell-mediated immune responses; meaning that the immunity is not generated by

antibodies, but by the activation of molecules in the cell. Although this work is promising, further work needs to be done to investigate other agents that could be combined with ROP1 to achieve better results, or even complete protection against the parasitic disease.

Provided by University of Malaya