

Toxoplasmosis infection trick revealed by scientists

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Toxoplasmosis is a parasitic disease, primarily carried by cats. It is transmitted to humans by eating undercooked meat or through contact with cat faeces. It is particularly dangerous for pregnant women, whose foetuses can be infected via the placenta, and those with a weakened immune system, such as people infected with HIV. In severe cases, toxoplasmosis can cause damage to the brain and eyes, and even death.

Now researchers from London and Geneva have determined, for the first time, the atomic structure of a key protein which is released onto the surface of the parasite just before it invades host cells in the human body. They found that the protein known as TgMIC1 binds to certain sugars on the surface of the host cell, assisting the parasite to stick to, and then enter the human cell.

Using a novel carbohydrate microarray the team were able to identify the precise sugars to which the parasite protein binds. Following this the team used a combination of NMR spectroscopy and cellular studies to characterise the behaviour and interactions of the parasite protein and host cell sugars. This means that the team have a more detailed picture than ever before of exactly how the parasite recognises and attacks host cells in the body.

Professor Steve Matthews from Imperial College London's Division of Molecular Biosciences, one of the paper's authors, explains the significance of the research, saying: "Understanding the fundamental, atomic-level detail of how diseases like toxoplasmosis pick out and invade host cells in the human body is vital if we want to fight these diseases effectively.

"Now that we understand that it's a key interaction between a protein on the parasite's surface and sugars on the human cell which lead to the cell's invasion, there is potential to develop therapeutics that are targeted at disrupting this mechanism,

therefore thwarting infection."

Toxoplasma gondii, the parasite that causes toxoplasmosis, is one of the world's most common parasites. Around a quarter to half of the world's population is thought to be infected, and around 1% of people in the UK catch toxoplasmosis each year. In the majority of cases, those affected don't have any symptoms. But for those with weakened immune systems, and unborn babies, toxoplasmosis can cause very serious health problems.

Source: Imperial College London

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