

Heparan Sulfate - Could It Help Stop Transmission Of Malaria?

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Malaria is a very common and deadly problem in developing countries. Birds, rodents, humans and primates all can be infected with malaria but each one is infected with different species of mosquito. There needs to be a perfect match at the molecular basis for malarial parasite to spread from one species to another. (1)

Linhardt and his collaborators were first to discover the link between the spread of Malaria in humans and Heparan sulfate in 2003 (1). The liver is the first organ to be infected by malaria parasite in mammals. The researchers found that Heparan sulfate in the human liver binds to parasite and is transporter of the disease to human blood stream.

Heparan sulfate is a sulfated polysaccharide found on the surface of cell as a part of protoglycans. Polysaccharide mediates the interaction between numbers of different proteins (2).

Linhardt worked to determine if Heparan sulfate is also present in Anopheles mosquito. Collaborative studies were undertaken at New York.

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These studies reported that Heparan sulfate has been isolated for the first time from the mosquito *Anopheles stenensi*. The glycosaminoglycans were isolated from salivary glands and midguts of the mosquitos in quantities sufficient for disaccharide microanalysis. Both these organs are invaded at different stages of plasmodium life cycle. Mosquito Heparan sulfate was found to contain the critical tri-sulfated disaccharide sequence that is similar to the one found in human liver Heparan sulfate, which is responsible for binding to the circum-sporozite protein found on the surface of plasmodium sporozite (3,4).

Rensslear team at New York headed by Robert J. Linhardt (1) proved that there is a perfect match between Heparan sulfate found in human liver and the one in mosquitos that carry the malarial parasites. They also concluded that Heparan sulfate binds to the parasites in the mosquito and cause clinical disease.

The team of researchers thus reported that "this discovery allows thinking differently about preventing the disease. The spread of the disease can be stopped completely if we can stop Heparan sulfate from binding to the parasites in the mosquito (5).

References:-

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