REGIONAL CENTRE FOR BIOTECHNOLOGY
Seminar series

Studies on complement evasion in poxviruses provide insight into their host tropism

Arvind Sahu, PhD
National Centre for Cell Science, Pune

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Seminar Room

Variola and vaccinia viruses, the two most important members of the family Poxviridae which hold a special place in the history of mankind, differ prominently in their host tropism. Variola virus exhibits strict human tropism while vaccinia virus is known to infect a range of domestic animals (observed during smallpox vaccinations) and its outbreaks are frequently reported in dairy cattle. Earlier, we and others have shown that these viruses encode functional regulators of complement to subvert the host complement system. The variola virus complement regulator was named SPICE whereas the vaccinia virus complement regulator was named VCP. Intriguingly, consistent with the host tropism of these viruses, SPICE displays preference in inhibiting human complement and VCP displays preference in inhibiting bovine complement. Our recent mutagenesis and mechanistic studies demonstrate that the major determinant for the switch in species-selectivity of SPICE and VCP is the presence of oppositely charged residues in the central complement control modules which help enhance their interaction with the respective complement factor I and C3b. We therefore propose that these regulators function as one of the determinants of poxvirus tropism.