Omar Bagasra, Virol Mycol 2018, Volume 7
DOI: 10.4172/2161-0517-C1-023

Sexual transmission of Zika Virus via spermatozoa

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What is the mechanism of sexual transmission of Zika Virus? By utilizing exquisite reverse-transcriptase-initiated in situ PCR (RT-in situ PCR), which enables an improved visualization of spermatozoa's subcellular compartments; we precisely localized the mid-piece of sperm that carry receptors for ZIKV. ZIKV is transmitted sexually and recent studies have verified ZIKV presence in semen of previously Zika-infected patients for more than 6-months post-infection when ZIKV had disappeared from blood, saliva and urine. Strong serial analyses of various body fluids suggest that ZIKV can be transmitted between sexual partners. Currently, there is limited information on the association of the virus with human semen cell types that may carry the virus. Analyses were carried out to localize ZIKV for subcellular localization of ZIKV on cell types. The Tyro3 receptor for ZIKV was co-localized by dual immunocytochemistry with specific monoclonal antibodies. Three semen specimens were purchased from a commercial sperm bank. Motile sperm was separated from non-motile cells by the 'swim up' technique. Each of the semen fractions was infected with ZIKV at the multiplicity of infection (moi) of 0.1.0 and 1.0 and evaluated for the primary targets of ZIKV in the semen cells by RT-in situ PCR and confirmed by real-time RT-PCR. ZIKV was present primarily at the mid-piece of mature spermatozoa in about 30% of the sperm. In addition, we determined that Tyro3 receptors, primarily expressed on mid-piece of human spermatozoa, play a role in ZIKV binding and entry into spermatozoa. Our data strongly suggest a potential sexual/horizontal route of transmission for ZIKV primarily via infected sperms; most likely ZIKV enters the sperm via the Tyro3 receptor found at the mid-piece of the mature spermatozoa. We are uncertain as to what phase of spermatogenesis, that in human takes about 120 days, sperms are permissive to ZIKV. If permissiveness was very early during spermatogenesis males could be infectious for ~120 days after the disappearance of viremia in an infected man. Our findings bring a new focus on the current affords to develop ZIKV vaccine. Why in the presence of anti-ZIKV Abs infected men are still able to transmit the virus sexually? We suggest that only certain subclass of IgG (i.e., IgG4) can cross the blood-sertoli barrier therefore, a successful vaccine must provoke a subclass of IgG can quell ZIKV inside the seminiferous tubules.

Biography

Omar Bagasra has his research interests associated with the study of HIV and AIDS. For the past several years, he has focused on trying to gain insight into the molecular pathogenesis of HIV and role of microRNA in protection against lentiviruses. In 1998, he was the first to clearly discuss the protective role of small RNAs against *Retrovirus* and *Lentivirus* (HIV and Molecular Immunity). His unswerving dedication to his work has resulted in over 200 scientific articles, book chapters and books. In 1995, he was nominated for the King Faisal Award for Medicine. In 2002 and in 2014 he received Faculty Scholar Award from the American Association for Cancer Research. In 2006 he was the co-recipient of the South Carolina Governor's Award for Excellence in Science. From 2002-2006 he also served as the Council Member of the American Association of Cancer Research. He currently serves as Professor of Biology and the Director of the South Carolina Center for Biotechnology at Claflin University. Much of his work has been recognized in top-tier journals, such as *New England Journal of Medicine,* The Proceedings of the National Academy of Science, Journal of Virology, Journal of Immunology, Journal of Pediatrics, Nature Medicine, Nature Protocol and many other journals.

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