The role of exosomes in persistent Adenoviral infection

Viral infections cause millions of deaths and unmeasureable suffering worldwide. Some of these infections are acute, causing its effects and either being cleared out by the immune system or killing the patient within weeks, whereas other persist for months, years or for life. Amongst persistent viral infections, the one caused by HIV is possibly the most commonly well-known, and is to date residing in more than 30 million people. There are persistent viral infections that exist in almost all people in Europe and North America, examples include Cytomegalovirus, Adenovirus, Herpes simplex virus, Epstein-Barr virus and Simian virus 40. Mostly, these virus infections cause no damage and will never be noticed by the infected person at all, but for the weak, the elderly, or patients who have received transplanted organs or those with non-functional immune systems, these non-visible infections can start causing severe problems. As if all police forces were lost in society, there would be no street control and anarchy would soon break loose, the situation would be similar in a patient with a weak immune system in which quiescent infections could start causing illness and even death. Viruses use different strategies to achieve these quiescent or persistent states, and many details of these strategies are still unknown.

Exosomes are a type of bubble, far smaller than cells, which bud off from cells to ship material to other cells. Recently, it was found that several viruses can use exosomes to ship their own virus material between cells. In this project, I have been isolating exosomes from cells infected with Adenovirus to investigate the exosomes and see if they can be used by Adenovirus to keep cells persistently infected. I found a viral component called viral micro RNA in my exosomal samples. These viral micro RNAs have previously been found to counteract several defense systems that cells use against viruses, so this could mean that Adenovirus use exosomes for their own benefit. Perhaps this could even contribute to keeping cells infected with Adenovirus. I also found some, but still very modest, indications that Adenovirus can surround themselves with exosomes. This would provide a means for Adenovirus to hide from antibodies and other parts of the immune system. This has already been shown for HIV-1 so it could very well be the same case for Adenovirus.

What I have found is just a very small scratch on the surface of a highly complex system of interactions between virus and host.

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