

HANTAVIRUS: An Aerosolized Virus

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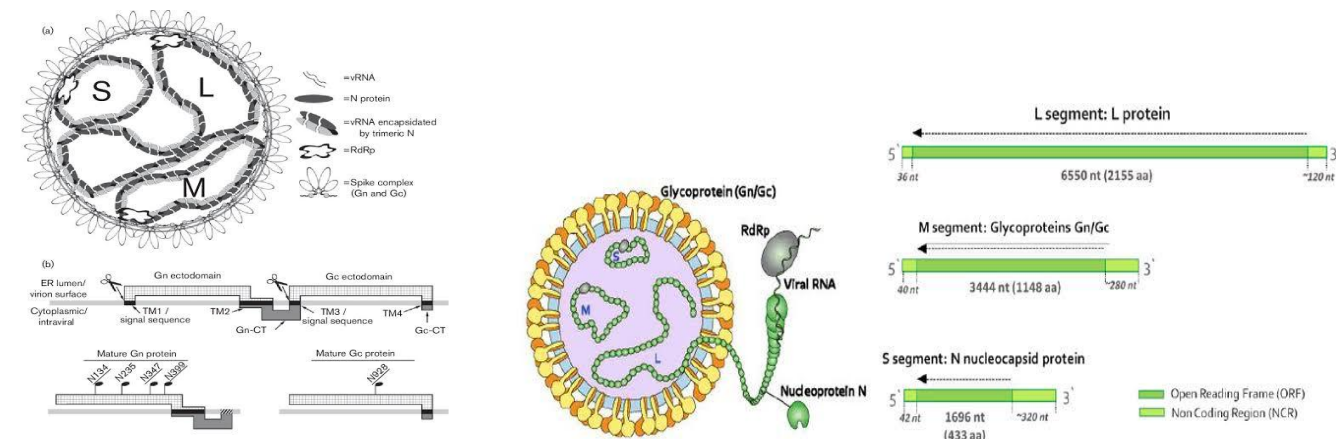
Abstract— Viruses are small microscopic or submicroscopic organelle which depend on living organisms (host) for their reproduction and growth. The study of viruses known as virology. Viruses may attack all types of living organisms and plants too such as tobacco mosaic virus. They contain genetic material DNA or RNA which contains proteins, capsid and envelope. The shape of the viruses may not be particular and vary from virus to virus. Transmission virus mainly occurs by arthropods through infected specimen urine, feces and transmission of host through contaminated food and water by vectors. To the animals transmission of virus through blood sucking arthropods. And some of viruses such as influenza are transmitted through coughing and sneezing. Fecal to oral route transmitted viruses may cause gastroenteritis. Some are transmitted through sexual contact such as HIV. From these types of viruses hanta virus is the one of the viruses which is transmitted through rodents. Hanta belongs to the family of bunyavirus. They - ve RNA containing viruses. It is an enveloped virus containing three single standard segments such as S-segment, M-segment and L-segment. The S is a small segment, M is a medium segment and L is a large segment. These viruses may replicate into the cytoplasm of the cell. The shape of these viruses is about spherical shape and having the size of 80 - 120 nm. These viruses may especially be found in Asia particularly in China, Russia and Korea. These viruses may cause HFRS (hemorrhagic fever with renal syndrome), HPS(Hantavirus Pulmonary Syndrome).

Keywords— Virology, Submicroscopic organelle, Negative RNA, Hantavirus, Bunyavirus.

I. INTRODUCTION

Hantavirus (group of RNA containing viruses)The virus is named after the Hantan River area in South Korea, where one of the early strains of the virus was isolated in the 70s.it is - ve RNA virus with three segmented single stranded RNA the S-segment encodes for

nucleocapsid (N) protein.[1] Which is enclosed or composed of V-RNA encapsidated by trimeric N RdRp. M-segment encodes polyprotein that Co translationally cleaved to yield an envelope of glycoprotein G1 and G2. And the L-segment encodes for the viral transcriptase or viral replicase. They replicate on the cytoplasm of the cell.[2,3]



Hantavirus may classified into

- Hantaan virus
- Dobrava virus
- Seoul virus
- Puumala virus
- Prospect hill virus
- Sin nombre virus

Each specific virus has a specific rodent host. Hantaan viruses found in eastern Asia particularly in China, Russia, Korea, Scandinavia, Western Europe and Western Russia are transmitted through rodents such as field mice.[4] Dobrava- Belgrade virus in the Balkans and Greece transmitted by

yellow necked mouse. Seoul is the moderate and worldwide found hantavirus it is due to rodents such as Norway rat or domestic rat. Puumala virus is the bank vole. Prospect hill virus found in the United States and it is due to rodent meadow vole. Sin nombre virus found in North America due to rodent deer mouse.[5] These types of viruses cause damage to Pulmonary system and renal system. These are aerosolized viruses transmitted from urine, feces, saliva on infected organisms and less frequently through bite of arthropod infected hosts. Most of the symptoms may develop usually 1-2 weeks of exposure but rarely about 7 weeks. Hanta and

Dobrava May cause severe effects while Seoul and Puumala cause moderate effects.[6,7]

TABLE: Types of hantaviruses and their geographical regions

Hantavirus	Geographical region	Reservoir	Pathology	Mortality
Hantaan	Asia	Field mouse	Renal	5-15%
Seoul	Worldwide	Domestic rat	Renal	1%
Puumala	Northern Europe	Bank vole	Renal	1%
Prospect hill	United states	Meadow vole	No known human disease	N/A
Sin nombre	Northamerica	Deer mouse	Pulmonary	50%

Symptoms may be identified during hanta virus is

- Fatigue
- Fever
- Muscle aches, especially in the thighs, hips and back
- Headaches
- Chills
- Dizziness
- Nausea, vomiting, diarrhea or abdominal pain
- Later symptoms include coughing and shortness of breath.

Hantavirus may of two type they are HPS (hantavirus Pulmonary Syndrome) which may caused to Pulmonary system, majority of HPS are caused due to subtype Sin Nombre of hantavirus and HFRS (hemorrhagic fever with renal syndrome) There is rapid and dramatic damage observed in kidneys during worst forms of the disease . These two symptoms of hantavirus may be due to rodents. diseases such as Korean hemorrhagic fever, epidemic hemorrhagic fever, and nephropathia epidemica are included in HFRS and causative organisms or viruses Hantaan, Dobrava, Saaremaa, Seoul, and Puumala. In the USA hanta virus may cause hantavirus Pulmonary Syndrome and in Asia, Europe haemorrhagic fever with renal syndrome.[8] It mainly spreads through rodents and is an aerosolized virus containing airborne particles containing excreta transmitted through rodents urine,dropping, feces and saliva less frequently through arthropods infected hosts. Hanta in the USA is found as SinNombre virus which is caused by deer mice. Hantavirus Pulmonary Syndrome sometimes may be fatal. Rodent infestation around the home remains primary risk for hanta exposure even to healthy individuals. Rare. Cases of person to person transmission occurred in hantavirus is About 42 % of Cases may lead to death due to hantavirus and also its begins as common illness such as flu and there by early stage, may experience fever, chills, muscle aches, headaches, fatigue, nausea, vomiting, and shortness of breath, and gastrointestinal trouble and there by accumulation of fluids in the lungs and decreased blood pressure and may lead to death. Majority of cases HPS and HFRS may not be transmitted from person to person. There is no significant pathogenesis of the hantavirus. And until now no medication has been prepared for the hanta virus and the medication prescribed for the hanta virus is intravenous riniferin antiviral medication along with

medication prescribed for fever and pains. And the treatment may be followed as management of fluids such as hydration, electrolyte balance levels. Maintenance of oxygen and blood pressure levels. Several laboratory tests are used to confirm a diagnosis they have serologic test results positive for hantavirus infection, evidence of hantavirus antigen in tissue by immunohistochemical staining and microscope examination, or evidence of hantavirus RNA sequences in blood or tissue.[9]

II. DISCUSSION

Hantavirus so far they were first detected in May 1993 in southwestern United States. Hantaviruses belong to the order called Bunyaviruses and have 12 families, as we know it is the the group of viruses encoded by envelope containing three negative RNA is one of the fatal virus by which the HPS and HFRS may occur in which the lungs and kidney may damages as the HPS is most dangerous than that of HFRS and the tranission of HPS may person to person transmission while the HFRS is not transmits to person to person as we are discussing its main vector is rodents and it's a aerosolized virus and spread through the rodent urine, feces and saliva. So avoiding rodents near our surroundings is one of the best methods to avoid these types of viruses is cleaning, maintaining the store room and other rodent sites are the best methods. Avoiding rodents as much as possible is the finest method of prevention of hantavirus.[10]

III. CONCLUSION

Being aware of these viruses, stays hygiene to keep ourselves healthy and maintain surroundings clean. Hantavirus mainly spreads through the rodents, urine, feces and saliva; it's an aerosolized virus. They can discharge fluids through lungs and kidney as they cause fatal to us being aware of this type of virus getting away from rodents and keeping surroundings clean from rodents excreta is most important because no vaccine has been prepared until now.

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