IS TETTNANG VIRUS A POSSIBLE ARBOVIRUS?

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Abstract. The paper describes the isolation of 21 identical virus strains during virus isolation experiments in SPF suckling mice strain ICR. The isolated strains were first identified as closely related or identical to Tettnang virus and later as closely related to mouse hepatitis virus. Tettnang virus seems not to be an arbovirus.

Tettnang virus is listed in the Berge's Catalogue of Arboviruses as a possible arbovirus (Berge 1975). Recently we have found some evidence that makes this rating doubtful, therefore we present here our findings.

In the summer months of 1977 virus isolation experiments were done in our laboratory, from blood and spinal fluid of febrile patients with CNS involvement by i.c. inoculation of 1–3 day old suckling white mice. The litters of SPF mice strain ICR were supplied by the same laboratory animal farm as in the previous years. The inoculated mice were observed for 21 days. Mice dying in the first 48 hours were discarded. From all other dying or dead mice an i.c. passage of a bacteriologically sterile 10% brain suspension was done. No virus had been isolated. The percentage of mice dying of unknown reasons or cannibalism between the 3rd and the 21st days had been 1.8±0.6%.

Suddenly in the middle of the summer season the delivery of litters of suckling white mice was stopped and thus we were forced to order litters from another farm. This new supplier was sending also SPF mice strain ICR. The tested material was inoculated under the same conditions but the percentage of cannibalism and death had risen to an unexpected level of 20.7±1.5% (P < 0.001). Animals were dying from 6th up to 20th day post inoculation. Cannibalism or death was observed in 66.7% of inoculated animals between 10th to 16th day. From bacteriologically sterile 10% brain suspensions inoculated i.c. in equally old suckling mice, 21 agents were isolated. Eleven reisolation experiments were successful. The signs of disease in all mice were similar and resembled the usually observed one in suckling mice inoculated with nonadapted neurotropic virus strains.

For further identification experiments we picked up the strain Z/60. This strain was reisolated from the original blood specimen. The first signs of disease were observed in the mice inoculated with the patients blood from 4th day and 8 mice died between 6th and 12th day. Three mice survived. In the next passage the incubation time had shortened to 4–7 days and all inoculated mice died. In the 3rd passage the incubation time had shortened to 4–5 days, and in the 4th passage to 3–4 days. The corrected i.c. infectious titer in suckling mice of a suspension prepared from the brain of mice of the fifth passage was 5.1 dex LD50/ ml (Rödl and Hubálek 1978). The titer of s.c. inoculated mice was 3.4 dex LD50/ ml. Young mice intracerebrally inoculated with a 10% suspension from the 3rd mouse brain passage have survived.

In cell culture of Vero and PS cells inoculated with the same suspension no cytopathic effect was observed.
Chloroform and ether reduced the infectious titer in i.c. inoculated suckling white mice by corrected 4.2 resp. 3.1 dex LD50/ ml.

The next step undertaken was to find out if the patient whose blood had been used in the isolation experiment, had neutralizing antibodies in his convalescent serum. In an i.c. virus neutralisation test in suckling white mice a significant decrease of the infectious titer was not detected.

Suspicion arose that a virus had been picked up from the brain of enzootically infected suckling white mice. To elucidate this question the following experiments were undertaken. Suckling white mice of the same age as mentioned above, from the same farm, were immediately after their arrival i.c. inoculated with phosphate buffered saline (PBS). During the whole observation period of 21 days these mice were housed separately in a room where no other inoculated mice were kept. Six litters have been thus inoculated. In all litters cannibalism, disease and death of mice between 7th and 15th day were observed with a similar clinical picture. A bacteriologically sterile 10% suspension prepared from the brain of a dead mouse of the litter No. 2 killed i.c. inoculated mice in the next i.c. passage from 3rd to 14th days. In the 3rd passage the incubation period was shortened to 3—5 days. The isolated strain has been designated “PBS2”.

Our suspicion was strengthened that we were dealing with a enzootic virus infection of white mice. We ordered therefore 5 more litters but this time the litters of suckling mice were kept without i.c. inoculation for 21 days in a separate room. Again cannibalism, disease and death were observed in all litters beginning on 7th up to 18th day post inoculation with the same signs of disease. A bacteriologically sterile 10% suspension prepared from the brain of a mouse which died on 15th day in the litter No. 3 killed in the next passage i.c. inoculated mice in 5—8 days. The isolated strain has been designated “03”.

The signs of disease in all mice, the biological properties and the sensitivity to chloroform and ether of the isolated virus strains “Z/60”, “PBS2” and “03” were similar to those described in literature as typical for Tettnang virus (Rehse—Küpper et al. 1973, Abar et al. 1976, Kožuch et al. 1978, Danielová et al. 1978, Moussa, personal communication). We asked immediately three authors who have described Tettnang virus isolations to send us hyperimmune sera. By return mail hyperimmune mouse sera were obtained. They have been designated in our laboratory as: AK63, K247 and M63.

In a counter immuno-electrophoretic test (CIEP) all the three above mentioned isolated strains, (“Z/60”, “PBS2” and “03”) have been identified by all three hyper-immune sera as visuses closely related or identical to Tettnang virus.

The strains “Z/60” and “03” were tested with the hyperimmune mouse serum AK 63 in a complement fixation test (CFT) also with a positive result. Sera M63 and K247 were no more available.

Tettnang virus has never been stored or handled in our laboratory before. The isolated strains were tested in further CIEP and CFT with mouse hepatitis virus (MHV) antigen and MHV immune serum. The results provided evidence that our strains are closely related to MHV virus.

And so accordingly it seems to be right to suppose that Tettnang virus infection is a spontaneous virus infection of white mice.

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ЯВЛЯЕТСЯ ВИРУС ТЕТТНАНГ ВОЗМОЖНЫМ АРБОВИРУСОМ?
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Резюме. В работе описано выделение 21 идентичных штаммов вируса полученных при экспериментах по выделению вируса от мышей-сосунец племени SPF штамма ICR. Выделенные штаммы сера идентифицированы как близкие или идентичные с вирусом Теттнанг и позже как близкие или идентичные с вирусом мышинного гепатита. По видимому вирус Теттнанг не относится к арбовирусам.

REFERENCES


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V. International Congress of Acarology

The fifth International Congress of Acarology was convened at one of the prominent universities of the United States, Michigan State University, East Lansing, August 6—12, 1978, and was attended by almost 280 participants from 31 countries of five continents. The congress was held at Holmes Hall and MacDonel Hall in the area of the university Campus where the guests were housed. Dr. Edward W. Baker, one of the prominent American acarologists was elected the President of the Congress. The event was sponsored by the Entomological Society of America and Acarological Society of America.

The working programme was dealt with in six parallel sections (Ecology, behaviour and bionomics; Systematics, morphology and evolution; Physiology, biochemistry and toxicology; Medical and veterinary acarology; Agricultural acarology and Stored products acarology). Besides these sessions also a number of symposia were organized which were devoted to present-day problems, primarily concerning medical and agricultural acarology, soil acarology, stored products pests, and physiology and biochemistry of mites, mainly their feromonal communication. Numerous evening meetings and informal conferences were also devoted to applied acarology, primarily to domestic acarology, biological and chemical control and formation of resistance to acaricides, as well as to many theoretical questions such as studies on specificity and parallel evolution of parasites and host, classification of higher categories, instruction in acarology, biogoeography etc. A special session was concerned with the studies of mite ultrastructure.

The programme of the proceedings was