

The arthropod-borne viruses of Brazil in relation to world groups*

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The interest of virologists has long been focused on viruses which are transmitted to the vertebrate host by arthropods. For many years research on this group was confined principally to the investigation of yellow fever infection and epidemiology in South America and Africa and the tick-borne infections in Europe and Asia. More recently the field of arborviruses in general has been the subject for study and in the early 1950's six field stations were opened by the Rockefeller Foundation in diverse ecological situations throughout the world in cooperation with local government agencies. The Belém Virus Laboratory, organized in 1954 as a joint project with the Serviço Especial de Saúde Pública at the Institute Evandro Chagas is one of these and has proven to be a rewarding center for arborvirus studies. During subsequent years other brazilian organizations** have contributed in personnel or money toward this success.

At the time that the Belém Laboratory was opened there were perhaps less than 50 recognized types of arborviruses in the world and a certain amount of systematic order had recently been introduced by the classification of a number of them into two serological groups,

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A and B (Casals and Brown, 1954) by hemagglutination testing. Now, six years later, nearly 150 types are known, most which have been classified into about 15 serological groups or complexes. About 25 types are still ungrouped for lack of discovered relationship with other isolates.

Between November 1954 and July 1961 the Belém Virus Laboratory isolated more than 1700 strains of arbovirus which have been identified as 40 distinct types. Twenty of these types belong to five serological groups, A, B, Bunyamwera, Simbu, and Turlock, members of which have been isolated in other parts of the world. Fifteen other types were shown to comprise two new groups, C and Guama, heretofore unknown, while the remaining six types are unrelated to each other or to any known virus available for comparison. The world distribution of the seven groups to which Brazilian isolates belong is shown in Table 1. The 4th arbovirus types isolated in Belém and their relationship to world groups are given in Table 2.

The original serological groups A and B of Casals are now represented in Brazil by five and four types respectively. One of the A group, Mayaro, was discovered almost simultaneously in Trinidad and Belém during investigations of human illness. Two new group A agents AR 10315 and AR 13136 were first isolated from mosquitoes in Belém, and serological surveys in Amazonia indicate that the latter or a close antigenic relative, is infective for man. Both, Eastern and Venezuelan Equine Encephalitis virus are found in the Amazon forest areas near Belém, by isolation from sentinel animals, and VEE has been isolated also from wild animals and mosquitoes.

Group B viruses, represented by Yellow fever, Ilheus, St. Louis and the new agent Bussuquara, produce the highest rate of antibody in man and animals in the Amazon region. All four types have been obtained from sentinel animals and from mosquitoes, but so far only Yellow fever and Ilheus have been isolated from man in this area. Infections with Bussuquara is undoubtedly common in certain rodents and perhaps in other animals, but the virus has not yet been shown to

cause human illness. Because of serological overlap in tests with B group antigens the B group antibody surveys are not conclusive evidence of specific infection.

Groups C and Guama are formed by types isolated first from the Amazon forests, and until now known by isolation only South America and the Caribbean region. Seven types in group C and eight types in group Guama have been discovered in the Belém Laboratory.

The recently recognized Bunyamwera group also has world-wide distribution. It is represented by at least eight types in Brazil, two of which show evidence of producing infection in man. One of these, Guaroa, has been isolated from five human cases in Amazonia, and HI testing on human sera has revealed a high incidence (18%) of Guaroa antibodies. The other, Cache valley, has been isolated only from mosquitoes in the Belém Laboratory but serological surveys indicate that both man and animals are susceptible to infestation with this virus. The six other types are known only from mosquitoes and have not yet been identified with a vertebrate host.

Table 1 – World distribution of arborvirus groups

Continents	A	B	C	Guamá	Bunyamwera	Simbu	Turlock	Other
Americas								
North	+	+			+		+	+
South	+	+	+	+	+	+	+	+
Africa	+	+			+	+		+
Asia	+	+			+	+	+	+
Australia	+	+						+
Europa		+						+

+ Isolation of virus classified in this group.

Table 2 – Arbovirus groups and types in Brazil

World groups (5)	Virus type (40)
A	EEE, VEE, Mayaro, AR10315, AR13136
B	Yellow fever, Ilheus, Bussuquara, St. Louis
Bunyamwera	Guaroa, Cache Valley, Kairi, Melao, AN32149 3 types Wyeomyia
Simbu	Oropouche
Turlock	AN32260
New Amazon groups (2)	
C	Oriboca, Murutucu, Marituba, Apeu, Caraparu, Itaqui, AN10655
Guama	Guama, Catu, AR12590, AN20525, AN8582, AN10615, AN20076, AN7722
Ungrouped (6)	Tacaiuma H22511 AN24232 AN24262 AN27326 AN27639

SUMÁRIO

Os arbovírus isolados em Belém, durante os seis e meio anos passados, foram classificados em 40 tipos sorológicos distintos, 34 dos quais são membros de sete grupos reconhecidos: A, B, C, Guama, Bunyamwera, Simbu, Turlock. Um tipo não está grupado e cinco não foram estudados suficientemente para permitir classificação, mas é sabido serem diferentes de todos os outros tipos da área de Belém. Dois dos sete grupos, C e Guama, são formados por isolamentos originariamente obtidos no Laboratório de Vírus de Belém.

SUMMARY

The arboviruses isolated in Belém have been classified in 40 distinct serological types, 34 of which are members of seven recognized groups (A, B, C, Guama, Bunyamwera, Simbu, Turlock).

One type is ungrouped, and five have not been studied sufficiently to permit classification, but are known to be different from all other types in the Belém area. Two of the seven groups (C and Guama) are formed by isolated originally obtained in the Belém Virus Laboratory.

REFERÊNCIAS

1. CASALS, J., e BROWN, L. V. – Hemagglutination with arthropod-borne viruses. *J. Exper. Med.* 99:429-449, 1954.

