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### Keywords

*Influenzavirus C#.*  
*Hemagglutination inhibition test.*

### Descritores

*Influenzavírus C#.* *Testes de inibição da hemaglutinação.*

### Abstract

The circulation of influenza C viruses in Rio de Janeiro, Brazil, was studied when significant levels of antibodies were detected (56.7%) with hemagglutination inhibition test, used as a standard methodology for influenza virus studies.

### Resumo

Foi estudada no Rio de Janeiro, RJ, Brasil, a circulação de vírus influenza C detectando-se níveis significativos de anticorpos (56,7%) através de reação de inibição de hemaglutinação, o qual é considerada como padrão para estudos em influenzavírus.

Influenza C viruses have been targeted as causal agents of benign clinical cases of influenza throughout the world, and few outbreaks have been observed in children and adults.<sup>2</sup> Most of the infected individuals normally have symptoms of fever for about two or three days, long lasting nasal discharge, mild cough, headache, malaise, and sore throat.<sup>2</sup> An age-related incidence of antibodies probable due to multiple infections have been detected by several authors in their studies of the human prevalence of antibodies induced by influenza C virus infections.<sup>2,3</sup>

The data reveal a continuous stimulation by recurrent clinical or, more commonly, sub-clinical infections.<sup>5</sup> Although these authors believe the level of antibodies remains stable for a long period of time, a rapid decline in the antibodies to influenza C viruses has already been demonstrated, which can explain the recurrent aspect of the infections caused by these viruses. This possibility is validated by the presence of low antigenic variability among influenza C viruses<sup>4</sup> as indicated above.

In an attempt to evaluate the influenza C virus circulation in Rio de Janeiro city, a small community population who sought care at a public university hospital was taken as a study group. We analyzed the specific humoral immunity in 67 sera from adult individuals who received care in the hospital clinic during 1996-1997. They were randomized to be analyzed in regard of their hemagglutination inhibition (HI) titers to influenza C virus.<sup>1</sup> Sera samples were serially diluted from 1:10 to 1:5,120, in triplicates, with subsequent addition of the viral antigen (sample C/Taylor/1233/74) and incubated for 18 h. The final reading was performed after the addition of "A" group human erythrocytes at 1% and new incubation for 2 h. The inhibition titer was considered to be the reciprocal of the highest dilution of the sera in which occurred complete hemagglutination inhibition.<sup>1</sup>

The results showed that the circulation of influenza C viruses is actually significant (56.7%). The percentages of HI titers at the threshold considered

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here (>80) after heat treatment were used as standard. The percentage of titers equal or higher than 80 was 56.7% while the percentage of sera with titers over 1,280 was only 4.5%, though occurred a raising of the HI titers of some sera. In fact, very little changes were detected when samples isolated over 17 years were studied, as it was already observed by Muraki et al,<sup>4</sup> showing that influenza C viruses are the most stable among influenza viruses. Samples of influenza C viruses possibly circulating in Brazil will be differentiated from the sample used here as standard; however, the reactivity of the antibodies from the analyzed sera indicated that the humoral immunity is always active, revealing that those circulating Brazilian samples of influenza C virus exhibit reasonable antigenic similarity

to the standard sample used.<sup>4</sup> This homogeneity must not be attributed to a long life immunity as can be believed,<sup>5</sup> situation that associated to the known low genetic variability would be a barrier against the naturally recurrent infections, which are known as typical characteristic of these viruses.

The significant serum positivity, the kindliness of the clinical cases and the persistence character, already observed in infections for these viruses, make us suppose that the importance of these viruses is actually underevaluated. Their role among the agents of respiratory virus diseases deserves further investigation. This kindliness of the infections should still work as a maintenance factor for the circulation of these viruses.

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