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Editorials

Gilberta Bensabath – Centenary of the discoverer of the high prevalence of hepatitis B and Delta in the Amazon – On the path to elimination as a public health problem!

On July 9, 2024, with the presence of the Minister of Health of Brazil, Nísia Trindade; the Secretary of Health and Environment Surveillance, Ethel Maciel, and the Governor of Pará State, Helder Barbalho, and many other authorities and directors and researchers of Instituto Evandro Chagas (IEC), the new Hepatology Sector was inaugurated in the Ananindeua campus, named Campus "Gilberta Bensabath." After 30 years of existence, the Hepatology Sector was one of the last to leave the old headquarters located in Belém, Pará, on Avenida Almirante Barroso. The following day, the Hepatology Symposium of the Evandro Chagas Institute began. These events also commemorate the centenary of the birth of Dr. Gilberta Bensabath, who was one of the most important researchers in the field of hepatology in Latin America.

Gilberta Bensabath was born in Alto Juruá, Cruzeiro do Sul, on July 30, 1924, in the State of Acre, and at the age of 5, she moved with her family to Belém, Pará State, at the other extremity of the Amazon region. From an early age, Gilberta showed a great interest in medicine and public health. She was one of the few women to enter the Faculty of Medicine and Surgery of Pará in 1944, completing the course in 1949. Dr. Gilberta Bensabath stayed between 1951 and 1959 in the interior of the Amazon, first in the municipality of Alenquer, in the Lower Amazon State and later in the municipality of Tomé-Açu, in the northeast region of Pará. In 1960, based on her vast field experience and interest in continuing her studies, she was transferred to IEC, on the staff of the Belém Virus Laboratory, a unit linked to the Rockefeller Foundation that worked with investigations on viruses. During the 1960s, the Belém Virus Laboratory followed an outbreak of a serious disease with aspects similar to Yellow Fever, which killed several children who lived in a location surrounding the Purus River. Dr. Gilberta Bensabath was responsible for the studies in the region and, in partnership with other professionals, concluded that the disease was a hepatitis different from the others known at the time.

This work started shortly after the discovery of the Australia antigen by Baruch Blumberg in 1962 and Kazuo Okochi and Toshio Murakami finally associated it with hepatitis B in 1968 [1] and were the first to demonstrate the high prevalence of hepatitis B virus infection in the Amazon, which was published in 1973 [2]. Mario Rizzetto discovered hepatitis delta in Europe in 1977 and showed that it was a different pathogenic agent in 1980 [3].

The Black Fever of Lábrea, a town located in the municipality of Boca do Acre, in the south of the state of Amazonas, was a serious pathology that had caused micro-epidemics in the Amazon basin for several decades near Purus and Juruá rivers, with a typical histopathological picture, with a large number of voluminous and mutivacuolated cells, the morula cells [4].

Gilberta Bensabath led then the studies that discovered that the new agent known as hepatitis delta virus (HDV) was highly frequent the western Amazon region and was the etiological agent of Lábrea Black Fever [5]. At the time these works were being developed, the team from the IEC Institute established an advanced center in Boca de Acre, in the state of Amazonas, where these works were developed. Fortunately, this center is still active, and research is going on there to determine the status of these infections!

The team of the IEC's Hepatology Sector, under the leadership of Dr. Gilberta Bensabath, carried out a series of very important works on viral hepatitis in the Amazon region, analyzing different indigenous and quilombola groups, pioneering work involving these populations often forgotten by researchers and public health [6].

Hepatitis B and Delta continue to be important public health problems in the Amazon region. Between 2012 and 2023, 25,023 cases of hepatitis B were reported in the North Region, 7,751 in Amazonas, 4,709 in Acre, and 6,145 in Rondônia. There were 1570 cases in 2023 in the northern region of Brazil, with an incidence/detection rate of 8.3 cases per 100,000 population. For hepatitis D, between 2012 and 2023, 1451 cases were reported in the North Region, 879 in Amazonas, 367 in Acre and 139 in Rondônia [7]. Some indigenous populations have almost 10% frequency of HBsAg seropositivity, and in some riverine populations, 66% of anti-HDV positivity has been found in HBsAg-positive cases [8]. In other words, the impact of these infections in the Amazon region is very large and the expansion of the two infections in the different Amazonian populations is not known in depth. More studies are still needed!

The work conducted by Dr. Gilberta Bensabath and her team, of which Dr. Manoel do Carmo Soares Pereira deserves special mention, was very important for the knowledge of hepatototropic virus infections in the Amazon region (Fig. 1). The clarification of the genotypes of the hepatitis B and D viruses was initiated by works carried out both in the Eastern and Western Amazons that demonstrated that the most frequent genotypes of HBV in the Amazon region are genotypes A, D and F, while there is an almost exclusivity of infections by genotype 3 of HDV [9].

This research group has also been chasing the presence of viral infections in other animal species for a long time. For example, in a study carried out in the 80s, using serological methods, they discovered that marsupials can be infected by viruses similar to HAV [10]. Currently, molecular methods have been able to confirm this infection [11]. Other studies on infections of other mammals with human hepatitis like viruses: **A** in four species of bat of the genus *Artibeus*, **B** in capuchin monkeys and in a neotropical bat (*Platyrrhinus lineatus*),

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Fig. 1. Gilberta Bensabath and Manoel do Carmo Soares Pereira.

C in horses and **E** in swines have also been carried out by the IEC researchers, in parallel with international researchers that have discovered human hepatitis related virus in several other species [12].

Gilberta Bensabath created a very important research group in the area of hepatology, working not only with hepatotropic viruses but also with other parasitic agents, such as *Echinococcus oligarthus*, which causes a pathology sometimes confused with hepatocellular carcinoma [13] or the finding of cysticercosis in agoutis [14].

She was not a researcher who wanted her name to appear in any work; quite the contrary, she has only 30 papers published in PubMed but everyone who knew her knows her importance for the establishment of all these lines of research at the IEC and discussed all the topics with the team.

She was one of the most important researchers in hepatology in Latin America, with work of international impact, stimulating her team to develop diverse research in the area and actively participating in very important public health measures for the country and encouraging research in related areas, within a revolutionary vision before the era of “One Health” that came to be placed as a priority for the control of new pandemics, with a very Brazilian (or Amazonian) preview on the interactions among human, animal and environmental areas. We live in the country with the greatest biodiversity in the world and the possibility of emerging or reemerging agents reaching human beings in Brazil is real and has already been shown [15]. Worldwide, the discovery of hepatitis B and delta, with its particular genotypes and characteristics of the Amazon region, is still a topic that deserves to be studied in more detail to understand how these different viral infections can spread and persist

The remarkable presence of Gilberta Bensabath in research and intervention events for the control of hepatitis in our country, always coordinating a large number of researchers who worked on the different causes of liver diseases around their mechanisms of dispersion among men, animals and the environment within the so-called concept of "One Health" that will undoubtedly allow a broader and more effective approach to the control of infectious diseases.

Finally, as the old African proverb says: "If you want to go fast, go alone. If you want to go far, go in a group." Gilberta Bensabath managed to create a group that will continue her work and we all have to thank her for her important participation in the fight to control hepatitis since the WHO created the commitment to eliminate it as a public health problem by 2030.

Declaration of interests

None.

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