Abstract. Seventy-five isolates from the State of Campeche, Mexico, an area endemic for localized cutaneous leishmaniasis (LCL), were characterized by isoenzyme markers (glucose phosphate isomerase, mannose phosphate isomerase, nucleoside hydrolase, phosphoglucomutase, 6-phosphogluconate dehydrogenase, and glucose-6-phosphate dehydrogenase). Seventy (93.3%) were identified as Leishmania (Leishmania) mexicana and 5 (6.7%) as L. (Viannia) braziliensis. This is the first report of authochthonous human LCL caused by L. (V.) braziliensis in the State of Campeche, Yucatan Peninsula, Mexico.

Materials and Methods

Study area. The study area was the State of Campeche, Mexico (17°48'N, 20°47'N, 89°25'W, 92°27'W), which is bordered on the north and northeast by the State of Yucatan, on the south by Guatemala, and on the east by the Gulf of Mexico. This state is an endemic area of LCL due to its ecologic conditions: a medium-size forest covers about 59.73% of Campeche with a tropical climate, a relative humidity of more than 80%, and an annual average rainfall of more than 1,400 mm.

This project was reviewed and approved by the Interinstitutional Committee for Health Investigations of the Ministry of Health of Mexico. Written informed consent to participate in the study was obtained from all patients.

Parasites. From January 1990 to July 1992, 153 patients with LCL determined by both clinical diagnosis and visualization of the parasite (smear, biopsy, isolation-culture) were studied in our laboratory. All of them were infected in the State of Campeche, Yucatan Peninsula, Mexico. Parasite isolation by needle aspirates taken from the edge of the lesions was positive in 75. Aspirates were seeded into a tube of Schneider’s Drosophila medium and cryopreserved in liquid nitrogen until their characterization.

RESULTS

Seventy-five isolates of Leishmania were characterized by the cellulose acetate electrophoresis method. All the isolates were obtained from human LCL cases who became infected in the State of Campeche, Yucatan Peninsula, Mexico. Each isolate was characterized for six enzymes and results are listed in Table 1. Each isolate was compared with all WHO reference strains and tested at least twice for the six selected enzymes.
cerated lesion, with no lymphangitis and no adenopathy, as it has been described previously with other *Leishmania* spp. The most affected group were males 15–45 years old (Table 2).

**DISCUSSION**

The main purpose of the present study was to characterize by isoenzyme electrophoresis 75 isolates obtained from human patients with LCL from the State of Campeche, Yucatan Peninsula, Mexico. The isolates were characterized with three enzymes that can accurately identify parasites in the genus *Leishmania*: glucose phosphate isomerase (GPI-EC 5.3.1.9), mannose phosphate isomerase (MPI-EC 5.3.1.8), and phosphogluconate dehydrogenase (6 PGDH-EC 1.1.1.44). The data in this study regarding *L. (L.) mexicana* supported the suggestion that *Leishmania* species have a high level of isoenzyme similarity. Furthermore, the results suggested that isolates that have similar epidemiology and geographic distribution usually have high levels of isoenzyme similarity, as indicated by their electromorph identity. This is the first report of authochthonous human LCL
caused by L. (V.) braziliensis in the State of Campeche, Yucatan Peninsula, Mexico. Leishmania (V.) braziliensis isolated from an ear lesion of a patient with LCL in the State of Oaxaca, Mexico has been previously reported.20

The Yucatan Peninsula is a discrete biotic province with an area of approximately 143,500 km².21 The region is a broad, flat shelf of marine limestone of geologically recent time (Paleocene to Recent). It includes the Mexican States of Yucatan, Campeche, Quintana Roo, and the portion of Tabasco east of the Rio Usumacinta and north of the Sierra del Norte de Chiapas, the northern part of El Peten in Guatemala, and the northern part of Belize.22 The peninsula is surrounded on three sides by water and bounded on the south by highlands that isolate this region from the rest of Central America. Thus, species might have evolved in isolation and the peninsula is an area of mammalian endemism with fauna that differ markedly from the rest of Mexico.23

The recent geologic formation of the Yucatan Peninsula and its geographic isolation might be the reason for the lack of the intraspecific variation in isoenzyme patterns and the predominance of L. (L.) mexicana as the causative agent of LCL in this biotic province. Leishmania (Viannia) braziliensis is a typical South American agent of leishmaniasis. In the present study, the patients with L. (V.) braziliensis were from southern Campeche near Guatemala. The distribution of this parasite might be moving northward and entering the Yucatan Peninsula through Belize and/or Guatemala relatively recently.

The Yucatan Peninsula is an important region in which to observe the evolution of L. (L.) mexicana in geographic isolation and to follow the extension of the more virulent L. (V.) braziliensis. Thus, this region is suitable for carrying out multidisciplinary studies to compare two transmission cycles and their respective ecoepidemiologies. A better understanding of the dynamics of transmission of LCL will hopefully lead to the control of this zoonotic disease in the New World, which is one of the major goals of the World Health Organization.

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