In tropical or subtropical areas such as Southern Japan, the Caribbean, Central and South America, both human T-cell lymphotropic virus type I (HTLV-I) and Strongyloides stercoralis infection are endemic (4, 8). Several studies have documented an unexpectedly high prevalence of S. stercoralis in HTLV-I carriers and of HTLV-I among S. stercoralis carriers. The links between two such taxonomically distant infectious agents remain unclear and controversial. Japanese S. stercoralis carriers were found to have a significantly higher seroprevalence for HTLV-I than non-S. stercoralis carriers (5). But conversely, Jamaican HTLV-I carriers did not exhibit higher rates for S. stercoralis antibodies than HTLV-I negative subjects (6). In Guadeloupe, a French West Indian island, HTLV-I is endemic (9), whereas parasitic diseases, with the only exception in Guadeloupe, HTLV-I is en- 

The links between two such taxonomically distant infectious agents remain unclear and controversial. Japanese S. stercoralis carriers were found to have a significantly higher seroprevalence for HTLV-I than non-S. stercoralis carriers (5). But conversely, Jamaican HTLV-I carriers did not exhibit higher rates for S. stercoralis antibodies than HTLV-I negative subjects (6). In Guadeloupe, a French West Indian island, HTLV-I is endemic (9), whereas parasitic diseases, with the only exception of S. stercoralis infection, have been largely eradicated in the last 20 years. We conducted a case control study among healthy blood donors in order to determine if HTLV-I infection is associated with S. stercoralis carriage. In Guadeloupe, subjects have to fulfill the French criteria for blood donation, i.e., fully informed consent, free donation, systematic pretest interview, and clinical examination; the sex ratio of Guadeloupean blood donors is about 1:1, and the mean age is 32 years (range, 18 to 65 years).

We compared the frequency of Strongyloides antibody detection among 119 HTLV-I-positive blood donors (85 females with a mean age of 49 ± 26 years and 34 males with a mean age of 49 ± 28 years) with that of 119 HTLV-I-negative blood donors (68 females with a mean age of 33 ± 22 years and 51 males with a mean age of 34 ± 22 years). Controls did not significantly differ with regard to age and sex from the general blood donor population. All of these subjects had been systematically screened for HTLV-I as blood donors (HTLV-I Enzymo Immuno Assay 2.0 Abbott) and confirmed positive for the case group (HTLV III WB 2.4 Genelabs). They were also blindly assessed for S. stercoralis antibodies by indirect immunofluorescence using Strongyloides ratti larval antigens, with a positive threshold titer set at 1/60 (3).

As shown in Table 1, a significant association was found between HTLV-I infection and S. stercoralis serological results. In total, 31.1% of HTLV-I positive subjects were found to have S. stercoralis antibodies, as compared to 10.9% of negative donors (age-adjusted odds ratio [OR], 2.08; confidence interval [CI], 1.0 to 4.35). The association appeared significant only in female (age-adjusted OR, 7.50; CI, 2.20 to 25.80), not in male (OR, 1.79; CI, 0.59 to 5.42), subjects.

In conclusion, this is the first report highlighting the association between HTLV-I infection and S. stercoralis antibody asymptomatic carriage. The male-female difference in the magnitude of the ORs should be interpreted with caution, as the number of male subjects was limited. Further epidemiological studies are necessary to examine in detail whether other factors such as socioeconomic status could interact with the HTLV-I–S. stercoralis association. Although some hypotheses have been put forward, such as virus-induced immune deficiency or the promotion of HTLV-I infection by the parasite (1, 7), the relation between the retrovirus HTLV-I and the worm S. stercoralis remains puzzling and needs further study. The possible relation is not purely speculative but has clinical implications, since both enhanced morbidity-mortality and treatment failures in dually infected subjects have been reported (2). Furthermore, the lack of efficient antiviral drugs for HTLV-I offers limited management options. However, once HTLV-I and strongyloidiasis have been identified by screening, the monitoring of both, and the thoroughly treatment of strongyloidiasis, can be helpful clinically.

### Table 1. Parasitic seroprevalence and association between HTLV-I infection and S. stercoralis antibodies

<table>
<thead>
<tr>
<th>S. stercoralis-</th>
<th>HTLV-I</th>
<th>HTLV-I</th>
<th>Crude OR</th>
<th>Age-adjusted OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>positive subjects</td>
<td>positive negative [95% CI]</td>
<td>[95% CI]</td>
<td>[95% CI]</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>37 (31.1) 13 (10.9) 3.68 [1.74–7.89] 2.08 [1.0–4.35]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>27 (31.8) 5 (7.4) 5.87 [1.95–18.87] 7.50 [2.20–25.80]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10 (29.4) 8 (15.7) 2.24 [0.69–7.39] 1.79 [0.59–5.42]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### References
Géry Courouble*
François Rouet
Cécile Herrmann-Storck
Muriel Nicolas
Laboratoire de Parasitologie
C.H.U. de Pointe-à-Pitre
Pointe-à-Pitre
Guadeloupe, France

Ermanno Candolfi
Institut de Parasitologie et de Pathologie Tropicale
Strasbourg, France

Michel Strobel
Service Maladies Infectieuses
C.H.U. de Pointe-à-Pitre
Pointe-à-Pitre,
Guadeloupe, France

Bernard Carme
Service de Parasitologie-Mycologie
Equipe JE 21-88
Cayenne
Guyane, France

*Phone: 0590.89.12.70.
Fax: 0590.89.11.56
E-mail: gery.courouble@wanadoo.fr