“Temple Monkeys and Health Implications of Commensalism, Kathmandu, Nepal”

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Presenter: Yi Lu
Nonhuman human primates to human transfer favorable
Swoyambhu Temple

- Important Buddhist holy place
  - Monks, priests and nuns
  - Locals
  - Worshippers
  - Tourists
Human/primate interaction

- Macaques climbing on humans
- Feeding
- Bites/scratches
Enzootic Simian Viruses

*Cercopithecine herpesvirus* 1 (CHV-1)

- 10-80% of wild population seropositive
- 100% seropositive in captive pop.
- Severe meningoencephalitis in humans
  - 70% death rate
Enzootic Simian Viruses

Simiam Virus 40 (SV40)
- Passed through urine
- 27% workers seropositive

http://www.bc.biol.ethz.ch/teaching/projects/HeleniusProject1.jpg/image
Enzootic Simian Viruses

Rhesus cytomegalovirus (RhCMV)
- Usually asymptomatic
- Infection is lifelong – viral shedding

http://www.cnprc.ucdavis.edu/images/CMV.jpg
Enzootic Simian Viruses

Simian Retroviruses

- Simian foamy virus (SFV)
- Simian type D retrovirus (SRV)
- **Simian T-cell lymphotropic virus (STLV)**
- **Simian immunodeficiency virus (SIV)**

http://hrem.nci.nih.gov/images/HIV-3D__2.jpg
Methods

- 39 rhesus macaques captured from 3 groups
  - 9.75% of estimated pop.
- Laboratory tests
  - Enzyme-linked immunosorbent assay (ELISA)
  - Immunoblot assays
  - Polymerase chain reaction (PCR)
  - Western blots
Results

Little correlation between seropositive % and age, sex and group except for CHV-1

Table 2. Seroprevalence of select enzootic simian viruses among Swoyambhu rhesus macaques*†

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>RhCMV (% ELISA-reactive)</th>
<th>SV40 (% EIA-reactive)</th>
<th>CHV-1 (% ELISA-reactive)</th>
<th>SFV (% WB-reactive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
<td>94.1</td>
<td>94.1</td>
<td>64.7</td>
</tr>
<tr>
<td>Female</td>
<td>22</td>
<td>95.5</td>
<td>86.4</td>
<td>63.6</td>
</tr>
<tr>
<td>Juvenile</td>
<td>13</td>
<td>84.6</td>
<td>76.9</td>
<td>23.1</td>
</tr>
<tr>
<td>Subadult</td>
<td>7</td>
<td>100.0</td>
<td>100.0</td>
<td>42.9</td>
</tr>
<tr>
<td>Adult</td>
<td>19</td>
<td>100.0</td>
<td>94.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>94.9</td>
<td>89.7</td>
<td>64.1</td>
</tr>
</tbody>
</table>

*RhCMV, rhesus cytomegalovirus; ELISA, enzyme-linked immunosorbent assay; SV40, simian virus 40; EIA, enzyme immunoassay; CHV-1, cercopithecine herpesvirus 1; SFV, simian foamy virus; WB, Western blot.

†Seven samples were ELISA-positive for simian retrovirus (SRV); 4 of these were indeterminate on WB, and 3 were negative. Polymerase chain reaction (PCR) failed to amplify SRV from any sample. Nine samples were ELISA-positive for simian T-cell lymphotropic virus (STLV), but none were positive on immunoblot, and nested PCR detected no STLV DNA. None of the samples was reactive to simian immunodeficiency virus.
Implications

- Low seroconversion rates in laboratory
  - SFV: 1%-5.3%
  - SV40: 3%-10%
  - SRV: 0.9%
- Different treatment protocols for local workers
- Effect of commensalism?
Management Strategies

- Understand transmission
- Restrict risky practices
- Education
- Prevent overreactions

http://guanubian.blogspot.com/images/macaque.jpg
Questions:

- Why are these diseases emerging now?
- How did the seroprevalence levels get so high?
  - Natural disease?