First Evidence of H10N8 Avian Influenza Virus Infections among Feral Dogs in Live Poultry Markets in Guangdong Province, China

TO THE EDITOR—On 17 December 2013, China formally confirmed the first human infection with an avian influenza A(H10N8) virus in Jiangxi Province [1]. The patient, a 73-year-old female, was hospitalized on November 30th with severe pneumonia. She died on 6 December. As of 15 February 2014, 3 cases of human infection with H10N8 avian influenza virus (AIV) have been confirmed in Jiangxi Province, 2 of which resulted in deaths [2]. The outbreak of H10N8 virus was in keeping with a second wave of human influenza A(H7N9) virus
infection in south of China [3]. As dogs in China have been shown to be infected with AIVs [4-6], we sought to study dogs living in close proximity to live poultry markets (LPMs) for evidence of infection with the H10N8 virus.

In this study, we tested aliquots of archived canine sera for antibodies against A/Jiangxi-Donghu/346/2013(H10N8) [1]. The sera were collected between August 2011 and August 2013 from 2357 feral dogs living in close proximity to LPMs and poultry farms in the rural areas of Shanghai, Guangdong, Zhejiang, and Jiangsu Provinces in China (see Materials and Methods as described elsewhere [4]). Hemagglutination inhibition (HI) and microneutralization (MN) assays were performed according to World Health Organization: Manual for the laboratory diagnosis and virological surveillance of influenza [7].

Six (6/2357) serum samples had both HI and MN antibody titers of ≥1:20 against H10N8 antigen (Table 1). Three samples had the MN antibody titers of 1:1280 and strongly suggestive of previous H10N8 infection. Interestingly, all the H10N8-positive samples came from dogs living near LPMs only in Guangdong Province and were collected between March 2013 and June 2013.

Table 1. Serological Assay Results Positive Against A/Jiangxi-Donghu/346/2013(H10N8) Influenza From Feral Dogs Sampled at Live Poultry Markets in Guangdong Province During the Period August 2011 to August 2013

<table>
<thead>
<tr>
<th>Date Specimen Collected</th>
<th>H10N8</th>
<th>H3N2</th>
<th>H5N1</th>
<th>H9N2</th>
<th>Pdm09H1N1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HI</td>
<td>MN</td>
<td>HI</td>
<td>MN</td>
<td>HI</td>
</tr>
<tr>
<td>2013.3.30</td>
<td>1:320</td>
<td>1:1280</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013.4.13</td>
<td>1:20</td>
<td>1:20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013.4.13</td>
<td>1:40</td>
<td>1:40</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013.4.13</td>
<td>1:320</td>
<td>1:1280</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013.4.13</td>
<td>1:80</td>
<td>1:80</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013.6.9</td>
<td>1:160</td>
<td>1:1280</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

These 6 dogs showed no signs of influenza-like illness.

Abbreviations: HI, horse RBC hemagglutination inhibition assay; MN, microneutralization assay.

In this study, we found to our knowledge, the world’s first evidence of H10N8 AIV infection among dogs. Because feral dogs in LPMs experience long-term environmental exposure to both live birds and poultry entrails, they may have an increased risk for infection with novel avian influenza viruses and may serve as sentinels for studying the ecology of influenza A viruses [4].

Unlike the numerous research studies regarding highly pathogenic avian H5 and H7 influenza viruses, there have been relatively few detections of avian H10 infections in both avian and the other species. Among all the available H10 sequences from Eurasia lineage, only 7 isolates are A (H10N8) and only 1 isolate, A/duck/Guangdong/E1/2012, was isolated from domestic poultry [11]. No poultry outbreaks caused by H10N8 virus have been previously reported. As all the positive samples were collected between March 2013 and June 2013, our serology data may provide important information about the emergence and spread of the novel H10N8 virus. Recent human cases of H10N8 infection and the paucity of H10N8 in avian species suggest that like H7N9, human infections are not preceded with clinical epizootics among poultry, and thus human illness and serological indicators in feral dogs living in LPMs may be the first indicators. Shu et al [1] have suggested that similar to the case avian influenza H5N1 virus infection in Hong Kong in 1997, more human cases of H10N8 infection might occur in the future. To effectively reduce the threat from novel zoonotic influenza strains like the novel H10N8 avian influenza virus, continuous epidemiological monitoring of different animal species such as dogs should be performed.

**Notes**

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A/Jiangxi-Donghu/346/2013(H10N8), the first human source H10N8 influenza virus, which was rescued by reverse genetics, was provided by Prof Wenbao Qi and Prof Ming Liao.

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