Comparative mapping of oculocutaneous albinism type II (OCA2), transient receptor potential cation channel, subfamily M member 1 (TRPM1) and two equine microsatellites, ASB08 and 1CA43, among four equid species by fluorescence in situ hybridization

R. Bellonea T. Learb D.L. Adelsonc E. Baileyb

aDepartment of Biology, University of Tampa, Tampa, FL;
bDepartment of Veterinary Science, University of Kentucky, Lexington, KY;
cDepartment of Animal Science, Texas A&M University, College Station, TX (USA)

Manuscript received 11 October 2005; accepted in revised form for publication by T. Haaf, 1 December 2005.
Results and discussion

The E. caballus chromosomes were identified using the international standard nomenclature for horse (ISCNH, 1997). In the horse, ASB08 and 1CA43 mapped to ECA1q17.1 and ECA1q17.3 as previously described (Breen et al., 1997; Chowdhary et al., 2003), and TRPM1 and OCA2 mapped to ECA1q17.2 and ECA1q17.3, respectively (Fig. 1A and E). Interphase spreads allowed us to confirm the gene order of these markers as ECA1q = cen–ASB08–TRPM1–OCA2–1CA43 (data not shown). This confirmed that both of the candidate genes for appaloosa spotting mapped within the same critical region as LP.

Our results indicated the gene order was, in fact, conserved in the three other equid species studied (Fig. 1B–D and F–H). Using the donkey chromosome standard proposed by Raudsepp et al. (2000), in Somali wild ass all four markers mapped to EAF2q21. For Burchell’s zebra the four markers mapped to EBU2q. The Hartmann’s zebra chromosomes were identified according to Richard et al. (2001), and these markers mapped to EZH3q.

Mapping these four markers to the chromosomes of three additional equid species has provided comparative mapping information for these species and demonstrated that this region has been conserved despite the rapid karyotypic evolution of this genus.

Table 1. Primer sequence and equine CHORI241 BAC clone identity for each of the markers mapped in this study

<table>
<thead>
<tr>
<th>Marker</th>
<th>Primer</th>
<th>Clone identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRPM1</td>
<td>TRPM1F 5’-TGTACCAGACCACATGCTAACCCTCTA-3’</td>
<td>117B6</td>
</tr>
<tr>
<td></td>
<td>TRPM1R 5’-TCTTCTGCAAGGGAGATGCTTTT-3’</td>
<td></td>
</tr>
<tr>
<td>OCA2</td>
<td>OCA2x16F 5’-AGCACGAGATTGATCCTGG-3’</td>
<td>190I17</td>
</tr>
<tr>
<td></td>
<td>OCA2X16R 5’-TCGGGCCAGCTGGCTGCTCA-3’</td>
<td></td>
</tr>
<tr>
<td>ASB08</td>
<td>ASB08F 5’-GACACGTGAGCAAGCTAGG-3’</td>
<td>188D9</td>
</tr>
<tr>
<td></td>
<td>ASB08R 5’-AGAATCAGCAGCTATGCG-3’</td>
<td></td>
</tr>
<tr>
<td>1CA43</td>
<td>1CA43F 5’-ATGGCAATGGTCTCTTCTCC-3’</td>
<td>95M17</td>
</tr>
<tr>
<td></td>
<td>1CA43R 5’-ATGGAACACCTAATGTCCA-3’</td>
<td></td>
</tr>
</tbody>
</table>
References


