

Previously identified homologs: Human MUC1 (also called PUM or PEM) [7,8].

Discussion: Tumor-associated mucin 1 (MUC1, previously called polymorphic epithelial mucin, PEM, and peanut lectin-binding urinary mucin, PUM) has previously been mapped to human Chromosome (Chr) 1q21 [8]. This region of human Chr 1 corresponds to the terminal breakpoints of linkage groups conserved with mouse Chr 1 and 3 [1,2]. Close linkage of MUC1 to the genes encoding erythroid α -spectrin (SPTA1) and the Duffy blood group (FY) [8] suggested the location in the mouse genome of *Muc1* to be on Chr 1. Instead, we have shown *Muc1* to map to mouse Chr 3 beside the gene for thrombospondin-3 (*Thbs3*). Furthermore, genomic sequence analysis has shown the polyadenylation signal of *Thbs3* to be located 2 kb upstream of the transcription start site of *Muc1* [9]. Therefore, *Muc1* represents an additional member of a large linkage group conserved between mouse Chr 3 and human Chr 1q21-1p22.

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References

1. Kingsmore, S.F., Watson, M.L., Seldin, M.F. (1993). *Genomics* 17, 794–795.
2. Moseley, W.S., Watson, M.L., Kingsmore, S.F., Seldin, M.F. (1989). *Immunogenetics* 30, 378–382.
3. Kingsmore, S.F., Giros, B., Suh, D., Bieniarz, M., Caron, M.C., Seldin, M.F. (1994). *Nature Genetics* 7, 136–142.
4. Desbois, C., Seldin, M.F., Karsenty, G. (1994). *Mamm Genome* 5, 321–322.
5. Craig, R.W., et al. (1994). *Genomics* 23, 457–463.
6. Spicer, A.P., Parry, G., Patton, S., Gendler, S.J. (1994). *J Biol Chem* 266, 15099–109.
7. Swallow, D.M., et al. (1990). *Nature* 328, 82–84.
8. Middleton-Price, H., Gendler, S., Malcolm, S. (1988). *Ann Hum Genet* 52, 273–278.
9. Vos, H.L., Devarayalu, S., deVries, Y., Bornstein, P. (1992). *J Biol Chem* 267, 12192–12196.

Interspecies fluorescence in situ hybridization further defines synteny homology between mouse Chromosome 11 and human Chromosome 17

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Species: Mouse and human

Locus symbols: *Mov9*, *D11Nds1*, *D11Mit7*

Map position: mouse, 11–45cM; human, 17p13

Method of mapping: Fluorescence in situ hybridization (FISH) [1]

Molecular reagents: A gel-purified 260-kb YAC clone D41D9 [2], which has been isolated from the Princeton mouse YAC library [3] and tested positive for the presence of *Mov9*, *D11Nds1*, and *D11Mit7* by PCR analysis, has been used for FISH on human chromosome spreads. D41D9 does not contain markers *Evi2*, *Trp53*, *D11Bay2*, or *Mdsh*. No chimerism has been found on YAC D41D9 by FISH on mouse chromosome spreads (not shown).

Discussion: The extensive region of synteny homology between mouse Chr 11 and human Chr 17 comprises two distinct linkage groups; that is, genes that are telomeric of *Evi2* on mouse Chr 11 map to human Chr 17q, and genes which are proximal from *D11Bay2* map to human Chr 17p, reflecting an evolutionary interesting rearrangement in this region [4–6]. To define the boundary of the two linkage groups on mouse Chr 11 more closely, we used YAC D41D9 for FISH on human chromosome spreads (Fig. 1A). Nineteen metaphase spreads were analyzed, and 12 (63.2%) showed labeling on both chromatids of each short arm of Chr 17. Our data suggest that the 260-kb DNA fragment from mouse YAC

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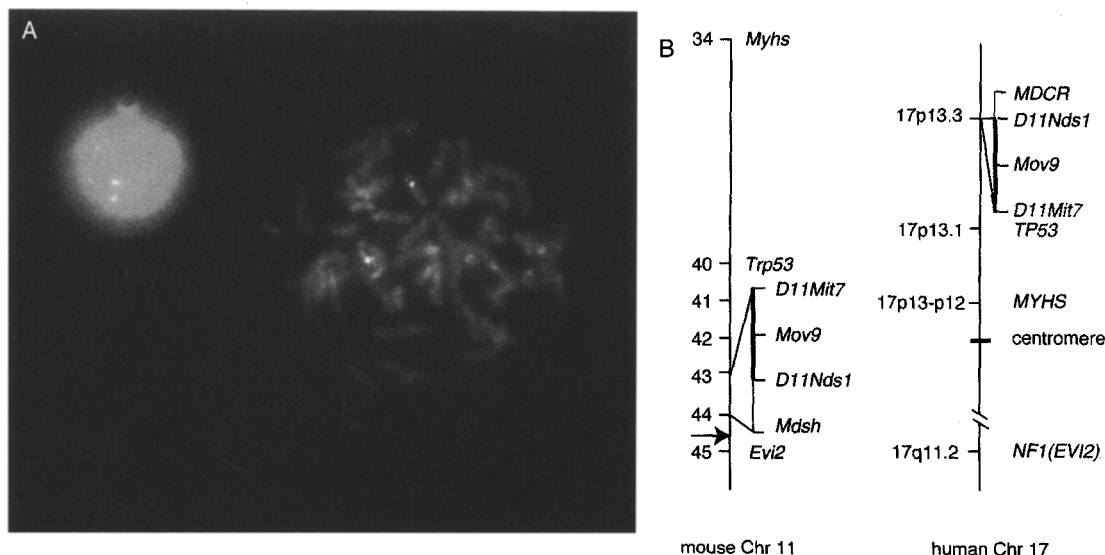


Fig. 1. (A) FISH localization of mouse biotinylated (Oncor, large fragment DNA labeling kit) YAC D41D9 (*Mov9*, *D11Nds1*, *D11Mit7*) to human chromosome spreads. Metaphase chromosomes from phytohemagglutinin (PHA)-stimulated peripheral blood lymphocytes were prepared according to standard cytological protocols. Hybridization was detected by two layers of Fluorescin Avidin DN (Vector Laboratories). Chromosomes were counterstained with propidium iodide/antifade and photographed on a Zeiss Axiophot. For chromosome identification, a biotinylated alpha satellite probe for Chr 17 was used (Oncor). (B) Schematic representation of the homology discontinuity between mouse Chr 11 and human Chr 17. YAC D41D9, carrying *D11Nds1*, *Mov9*, and *D11Mit7*, is represented by the bold line. The arrow marks the likely area of rearrangement. The gene order on the YAC and relative to *Trp53* and *Evi2* is based on the mouse Chr 11 consensus map [5] and our own data [7].

D41D9, carrying markers *Mov9*, *D11Nds1*, and *D11Mit7*, is highly homologous to human sequences on Chr 17p and indicates that the discontinuing breakpoint between mouse Chr 11 and human Chr 17 is located telomeric from these loci (Fig. 1B). Since the mouse homolog of the human MDCR locus (17p13.3), *Mdsh*, maps within 200 kb to *Mov9*, *D11Nds1*, and *D11Mit7* [7], the location of YAC D41D9 can be narrowed to 17p13.3 (Fig. 1B).

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References

1. Trask, B.J. (1991) Fluorescence in situ hybridization. *Trends Genet.* 7, 149–154.
2. Gnirke, A., Huxley, C., Peterson, K., Olson, M. (1992) Microinjection of intact 200- to 500-kb fragments of YAC DNA into mammalian cells. *Genomics* 13, 659–667.
3. Burke, D.T., Rossi, J.M., Leung, J., Koos, D.S., Tilghman, S.M. (1991). A mouse genomic library of yeast artificial chromosome clones. *Mamm. Genome* 1, 65.
4. Buchberg, A.M., Brownell, E., Nagata, S., Jenkins, N.A., Copeland, N.G. (1989). A comprehensive genetic map of murine Chromosome 11 reveals extensive linkage conservation between mouse and human. *Genetics* 122, 153–161.
5. Buchberg, A.M., Camper, S.A. (1993). Mouse Chromosome 11. *Mamm. Genome* 4 (Suppl.), 164–175.
6. Copeland, N.G., Jenkins, N.A., Gilbert, D.J., Eppig, J.T., Maltais, L.J., Miller, J.C., Dietrich, W.F., Weaver, A., Lincoln, S.E., Steen, R.G., Stein, L.D., Nadeau, J.H., Lander, E. (1993). A genetic linkage map of the mouse: current applications and future projects. *Science* 262, 57–68.
7. Kurtz, A. and Zimmer, A. (1995). The mouse homologue of the human Miller-Dieker chromosomal region (*MDCR*) maps to mouse Chromosome 11 in close proximity to *Mov9* and *D11Nds1*. *Mamm. Genome* 6, 145–146.