Assignment¹ of the eukaryotic translation initiation factor (EIF2S3) to tammar wallaby chromosome 5p by in situ hybridization

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¹ To our knowledge this is the first time this gene has been mapped in the tammar wallaby or any other marsupial.

Rationale and significance

The gene encoding the eukaryotic initiation factor EIF2S3 (also known as Eif-2 γ) is located on the X chromosome, at Xp22.11 in humans, and its homologue *Eif2s3* on band C1 in the mouse. EIF2S3 is widely expressed and escapes X inactivation (Ehrmann et al., 1998). In the mouse, expression of a Y homologue (*Eif2s3y*) has been shown to be essential for spermatogenesis (Mazeyrat et al., 2001). No Y homologue of EIF2S3 has been found in humans.

We show here that in the tammar wallaby, a model metatherian mammal, EIF2S3 lies on chromosome 5p along with many other genes from the distal two-thirds of human Xp. Thus EIF2S3 was part of a large autosomal addition to the eutherian X chromosome after the divergence of the metatherians approximately 180 Mya. In mouse, X and Y homologues have diverged, and the Y homologue now has a critical male-specific role. In humans, the Y homologue was lost, perhaps because a testis-specific copy of EIF2S3 has been retroposed to human chromosome 12 (Ehrmann et al., 1998).

Materials and methods

A male tammar wallaby genomic DNA lambda library was screened with a ³²P-labelled 1.9-kb mouse *Eif2s3* cDNA clone kindly supplied by Dr Michael J Mitchell (Marseille, France). Positively hybridising lambda clones were purified and DNA extracted. The TOPO Shotgun cloning kit (Invitrogen) was used to generate subclones of the lambda clone, which were screened for parts of *EIF2S3* by hybridisation with the mouse cDNA. Sequencing indicated that the lambda clone contained at least four complete *EIF2S3* exons, separated by intronic sequences. The lambda clone was labelled with biotin by nick translation and hybridised to tammar wallaby metaphase chromosomes. Hybridisation signals were detected with anti-biotin antibodies coupled with FITC, and metaphases were counterstained with DAPI.

Probe name(s): *MeugEif2s3-1.1*
Probe type: genomic
Insert size: approximately 20 kb
Vector: lambda EMBL3
Proof of authenticity: sequencing

Results

Mapping data:

Location: 5p (Fig. 1)

No. of cells examined: 13

Number of cells with specific signal: 1 (0), 2 (2), 3 (4), 4 (7) chromatids per cell

Most precise location: distal 5p

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Fig. 1. FISH mapping of *MeugEif2s3-1.1*. Hybridisation signals were detected on the short arm of tammar wallaby chromosome 5.