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Mapping[1] of the NDUFA2, NDUFA6, NDUFA7, NDUFB8, and NDUFS8 electron transport chain genes by intron based radiation hybrid mapping

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[1] This report includes corrections of 4 of 5 previous FISH assignments reported by Dunbar et al. (1997).

Rationale and significance

Complex I of the electron transport chain consists of 41 subunits, with 34 encoded by the nuclear genome. To date 14 of these genes have been mapped. To confirm the positions of 5 Complex I genes we previously mapped by FISH (Dunbar et al., 1997), we performed intron based radiation hybrid (RH) mapping, employing at least one intron of each of the 5 genes. The intron based RH mapping strategy is described elsewhere (Emahazion et al., 1998). Our findings indicated that amongst the 5 previous FISH localisations, 4 were in error (NDUFA6, NDUFA7, NDUFB8, NDUFS8) while 1 was correct (NDUFA2). Subsequent mapping studies with subfragments of the FISH mapped recombinants suggested chimerism and confirmed that the earlier FISH data was flawed (data not shown).

Material and methods

Intron based RH mapping of Complex I genes was undertaken as described elsewhere (Emahazion et al., 1998) using the Genebridge 4 Radiation Hybrid panel. PCR primers are detailed in Table 1. Map positions were calculated by RHMAPPER at the Whitehead Institute/MIT server (http://wwwgenome.wi.mit.edu/cgi-bin/contig/rhmapper.pl). To extrapolate from RH data to cytogenetic bands, we used gmap data tables at the Genetic Location Database (http://cedar.genetics.soton.ac.uk/public-html/).

Table 1. PCR primer details

Gene	Primer Name	Primer Sequence (5'–3')
NDUFA2	L1	GGGACTTCATTGAGAAACGCTA
	EB08-01R	TCAAACCCTTGTTCCCCTACCG
NDUFA6	oB14-U2	CTCTTGAACAATGCTTTAC
	BB14-04R	GACCATAGGCTAGGTGCTTGAG
NDUFA7	E.5a-01F	CAGTATCGCTGACGGAAGATGG
	E.5a-02R	CGGCTTAGGAGTGAGGTGAGGA
NDUFB8	EASH-01F	AGCCAGGTATTGACTGAATGTA
	3-2	CACAGCACTGAGTTTTATTAGGGA
NDUFS8	E23k-01F	AGTGTAGCCTCAGCCTCCCGAT
	E23k-02R	CTGCCCAAGCCCGACTTTCACG

Results

Table 2. Summarized mapping results

Gene	RH map position (cR)	Cytogenetic position	Previously reported locations[a]
NDUFA2	446.8	5q31.2	5q31 (a)
NDUFA6	158.5	22q13.1	21q22 (a), Chr 22 (b)
NDUFA7	40.2	19p13.2	20p13(a)
NDUFB8	552.4	10q23.2–q23.33	12q21 (a)
NDUFS8	359.4	11q13.1–q13.3	3q28 (a), 11q13 (c)

[a] (a) Dunbar et al., 1997; (b) Clark: Genbank Accession number Z82192; (c) Procaccio et al., 1997. Incorrect data are underlined.

References

Dunbar DR, Shibasaki Y, Dobbie L, Andersson B, Brookes AJ: In situ hybridisation mapping of genomic clones for five human respiratory chain complex I genes. Cytogenet Cell Genet 78:21–24 (1997).

Emahazion T, Beskow A, Gyllensten U, Brookes AJ: Intron based radiation hybrid mapping of 15 complex I genes of the human electron transport chain. Cytogenet Cell Genet 82:115–119 (1998).

Procaccio V, Depetris D, Soularue P, Mattei MG, Lunardi J, Issartel J-P: CDNA sequence and chromosomal localization of the NDUFS8 human gene coding for the 23 kDa subunit of the mitochondrial Complex I. Biochim biophys Acta 1351:37–41 (1997).

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