

[14] Isolation and Characterization of Animal Mitochondrial DNA

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Introduction

Since the early 1980s, the utility of mitochondrial (mt) DNA for evolutionary and population studies has become widely recognized. The characteristics of this molecule have been examined and described in detail, and data have accumulated both for the distribution and patterns of variation within the mtDNA molecule of specific organisms and for comparisons of many groups at a variety of taxonomic levels.¹⁻⁶ This information consti-

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⁴ R. G. Harrison, *Trends Ecol. and Evol.* **4**, 6 (1989).

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TABLE IV
CLONED REGIONS OF ANIMAL MITOCHONDRIAL DNA's^a

Type	Organism	Clones	Ref. ^b
Insect and <i>Daphnia</i>	<i>Drosophila yakuba</i>	Es	1
	<i>D. silvestris</i>	E	2
	<i>D. melanogaster</i>	Es	3
	Hawaiian <i>Drosophila</i>	1, 16	4
	<i>Anopheles quadrimaculatus</i>	E	5
	<i>D. melanogaster</i> subgroup	2, 1	6
	<i>D. nasuta</i> subgroup	b, 1	7
	<i>Apis mellifera</i>	16, 12	8
		b, 6, 8	9
	<i>Gryllus affirmus</i>	16, 12	10
	<i>Aedes albopictus</i>	16, 12	11
	<i>Pissodes nemorensis</i>	I, II, 8, 6, III, 3, 5	12
	<i>Daphnia pulex</i>	E	13
Nonavian vertebrate	<i>Rattus rattus</i>	Es	14
	<i>Gadus morhua</i>	Es	15
	<i>Xenopus laevis</i>	Es	16
	<i>Cyprinus carpio</i>	E	17
	<i>Homo sapiens</i>	Es	18
	<i>Bos bos</i>	Es	19
	<i>Mus musculus</i>	Es	20
	<i>Odocoileus virginicanus</i>	E	21
	<i>Canis familiaris</i>	E	22
	<i>Phoca vitulina</i>	Es	23
	<i>Balaenoptera physalus</i>	Es	24
	<i>Artebius jamaisensis</i>	E	25
	<i>Microtus pennsylvanicus</i>	I, II, 8, 6, 6, b	26
	Bovidae (four species)	12, 16	27
	Hominoidea (six species)	12	28
	Hominoidea (six species)	2, I, II, 8, 6	29
	Salmonid fishes	II, 8, 6, III, 3, 4L	30
Avian	<i>Gallus gallus</i>	Es	31
	<i>Coturnix japonica</i>	12, 16, 1, 2	32
Urchin	<i>Paracentrotus lividus</i>	Es	33
	<i>Strongylocentrotus purpuratus</i>	Es	34
	<i>Arbacia lixula</i>	E	35
Worm	<i>Caenorhabditis elegans</i>	Es	36
	<i>Ascaris suum</i>	Es	37
	<i>Meloidogyne javanica</i>	E	38
	<i>Romanomermis culicivorax</i>	3, 16	39
<i>Mytilus</i>	<i>Mytilus edulis</i>	Es	40

^a Key to references: (1) D. O. Clary and D. R. Wolstenholme, *J. Mol. Evol.* **22**, 252 (1985); (2) R. DeSalle and A. R. Templeton, *J. Hered.* **83**, 211 (1992); (3) M. H. L. de Bruijn, *Nature (London)* **304**, 234 (1983); R. Garesse, *Genetics* **118**, 649 (1988); (4) R. DeSalle, T. Freedman, E. M. Prager, and A. C. Wilson, *J. Mol. Evol.* **26**, 157 (1987); (5) A.

The choice of cloning vector will have an influence on whether highly purified mtDNA or crude cellular DNA is used. Cloning into plasmids such as pUC or pBR vectors is most easily accomplished using highly purified mtDNA. Cloning into vectors such as λ gt10 is accomplished using cellular DNAs but, again, is more easily accomplished using highly purified mtDNA.

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