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## Resource Brief: The National Non-Human Primate DNA Bank

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### Abstract

A National Non-Human Primate (NHP) DNA bank has been established by the National Primate Research Centers and the National Center for Research Resources, NIH, providing a new resource for comparative genomic studies. The collection includes genomic DNA samples from macaques, chimpanzees, baboons, vervets, marmosets, sooty mangabeys and titi monkeys. The repository includes DNAs from 697 unrelated animals, suitable for comparing allele representation within and between species. Another 474 DNAs are derived from family trios (dam, sire, off spring), and are useful for verifying the segregation of genetic variants. The National NHP DNA Bank includes specified holdings within each of the 8 National Primate Research Centers, though detailed information on the entire collection is available through a common website.

### Keywords

non-human primate; monkey; macaque; genomic DNA; DNA bank; comparative genetics

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The National Institutes of Health (NIH) – National Center for Research Resources (NCRR) supports eight National Primate Research Centers (NPRCs) within the United States. In total, the NPRCs house over 26,000 animals representing more than 20 species of non-human primates (NHP). This wealth and diversity of primates provides unique research opportunities for NPRC staff scientists, investigators from the host institutions, and

researchers throughout the world in the form of collaborations, animal studies, species-specific reagents, and tissue repositories.

To improve the access to, and availability of, NHP genomic material derived from the NPRC animal populations, the National Institutes of Health (NIH) - National Center for Research Resources (NCRR) formed a Genome Banking Working Group, comprised of representatives from each of the eight NPRCs, to establish a National NHP DNA Bank. As a result, a DNA repository, including 1171 DNA samples derived from 10 different Old and New World monkey species, was created (Table 1). While most samples were supplied by the NPRCs, others were drawn from the populations supported by the NCRR Animal and Biological Materials Resources program (P40 resources). To insure that the National NHP DNA Bank would support a variety of research needs, two broad classes of samples were collected: 'unrelated' animals, supporting comparative genetic, evolutionary or population studies and family trio sets (sire, dam and off spring), useful for verifying the Mendelian segregation of genetic variants.

In total, 697 samples from 'unrelated' animals were archived in the National NHP DNA Bank. In this case, 'unrelated' is operationally defined as animals that are unrelated for at least 3 generations. To maximize the genetic diversity, and to ensure representation of as many NPRC populations as possible, up to 50 'unrelated' animals of each species at each NPRC are included in this repository. The largest single species of this class is rhesus macaque (Indian-origin), which is represented by 290 different individuals, obtained from six of the NPRCs.

A total of 474 family trio sets were identified for inclusion in the National NHP DNA Bank. Up to 10 family-trios, per species at each NPRC, were archived; these samples were only obtained from NPRCs with documented pedigree data. Where no parentage is known, as with *Macaca fascicularis* (Mauritius), no family trio DNAs are available. Efforts were made to minimize the interrelatedness among trio samples, though this was not always possible.

The National NHP DNA Bank includes 4 different species of macaques, rhesus (*Macaca mulatta*), cynomolgus or long-tailed (*M. fascicularis*), pig-tailed (*M. nemestrina*) and Japanese macaque (*M. fuscata*). The macaque collection also reflects a diversity of geographical ancestries, including rhesus macaques derived from both India and China, and cynomolgus macaques derived from Indonesia and Mauritius. Similarly, DNA from baboons (*Papio hamadryas s.l.*) representing various sub-populations (olive, yellow, Guinea, Hamadryas) are available. Both unrelated and trio sets of DNAs from vervets, or African green monkeys, (*Chlorocebus aethiops*), were obtained from the Wake Forest Primate Research Center for inclusion in this bank. Finally, DNAs from marmosets (*Callithrix jacchus*) and Titi monkeys (*Callicebus cupreus*) provide New World monkey representation in the National NHP DNA Bank.

Detailed information about each DNA sample, including species classification, geographic ancestry, sex, age at sampling, and birth location are available through the National NHP DNA Bank web portal. Additional information on accessing the National NHP DNA Bank is available through the Research Resources section of the Primate Info Net (PIN) (<http://pin.primate.wisc.edu/research/>).

Though the common web site provides a comprehensive and detailed view of the bank holdings, the actual DNA samples are distributed across all eight NPRCs and thus are accessed directly through individual centers. The Web Portal provides contact information, order forms, and the material transfer agreement required for obtaining the DNA samples.

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Table 1

National NHP DNA Bank holdings, by species.

Genus Species	Common Name	Ancestry	Trios	Unrelated	Contributing NPRCs
<i>Macaca mulatta</i>	Rhesus macaque	Indian	180	290	CNPRC, NENPRC, ONPRC, TNPRC, WNPRC, YNPRC
<i>Macaca mulatta</i>	Rhesus macaque	China	36	66	CNPRC, ONPRC
<i>Macaca fasciata</i>	Japanese macaque	Japan	18	16	ONPRC
<i>Macaca fascicularis</i>	Long-tailed macaque	Indonesia	30	30	WaNPRC/WFUPC
<i>Macaca fascicularis</i>	Long-tailed macaque	Mauritius	0	20	WNPRC
<i>Macaca nemestrina</i>	Pig-tailed macaque	SEAsia	39	53	WaNPRC
<i>Papio hamadryas</i>	Baboon	Africa	30	50	SNPRC
<i>Pan troglodytes</i>	Chimpanzee	Africa	36	52	SNPRC, YNPRC
<i>Callithrix jacchus</i>	Marmoset	Brazil	30	50	NENPRC
<i>Chlorocebus aethiops</i>	Vervet	Africa	30	50	WaNPRC/WFUPC
<i>Cercocebus atys</i>	Sooty Mangabey	W. Africa	15	5	YNPRC
<i>Callicebus cupreus</i>	Titi Monkey	S. America	30	15	CNPRC

Key: CNPRC: California National Primate Research Center [NPRC]; NENPRC: New England NPRC; ONPRC: Oregon NPRC; SNPRC: Southwest NPRC; TNPRC: Tulane NPRC; WaNPRC: Washington NPRC; WNPRC: Wisconsin NPRC; WFUPC: Wake Forest University Primate Center; YNPRC: Yerkes NPRC.