

Melanesian and Asian origins of Polynesians as revealed by Y chromosome and mtDNA analysis

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The human occupation of the Pacific Islands was one of the last major migration events in human history. Polynesians have originated in Asia according to linguistic evidence or in Melanesia according to archaeological evidence. Here, we investigated the genetic heritage of over 400 Polynesians from eight different island groups, in comparison with over 900 individuals from potential parental populations of Melanesia, Southeast and East Asia, and Australia, by means of Y-chromosome and mitochondrial DNA (mtDNA) markers. We identified a dual genetic origin of Polynesians with both Melanesian (Y-DNA: 65.8%, mtDNA: 6%) and Eastern Asian (28.3% and 93.8%) genetic components in agreement with the “Slow Boat” hypothesis. Although dating methods revealed somewhat similar entries of Y/mtDNA haplogroups into Polynesia, suggesting a single major migration into Polynesia, haplotype sharing implies that haplogroups of Melanesian origin appeared earlier in Polynesia than those of Asian origin. The identified gradients in the frequency distribution of some Y/mtDNA haplogroups across Polynesia as well as the gradual west to east decrease of overall Y / mtDNA diversity in Polynesia not only provide evidence for the direction of Polynesian settlements but also implies isolation by distance, suggesting that Pacific voyaging was regular rather than haphazard. In addition, our genetic data demonstrate that Fiji, the most western Polynesian island, played a special role in the history of Polynesia: humans probably first migrated to Fiji, and subsequent settlement of Polynesia probably came from Fiji.