

Molecular Genetic Perspectives on the Origin of the Lyngngam Tribe of Meghalaya, India

PDF (Size: 1213KB) PP. 181-197 DOI: 10.4236/aa.2012.24021

Author(s)

Banrida T. Langstieh, Vikrant Kumar, Meka Aruna, Alla Govardhan Reddy, Shilpi Dasgupta, Alla Nirmala, Kumarasamy Thangaraj, Lalji Singh, Battini Mohan Reddy

ABSTRACT

Meghalaya, one of the Northeast Indian states, is inhabited by two major tribal clusters, Khasi and Garo. The disputed origin of the Lyngngam tribe of Meghalaya is a result of their geographic distribution, which is sandwiched between that of the above two major tribal clusters. Our earlier analysis of ethnohistoric, linguistic and demographic data suggested the neighbouring Khasi and Garo as the putative parental population(s) of Lyngngam. In this paper, we have investigated the Lyngngam, Garo and all the 7 subtribes of Khasi of Meghalaya using molecular genetic markers-autosomal, Y-chromosome and mtDNA-to explore the possible origin of the Lyngngam tribe. We obtained admixture estimates for Lyngngam versus the putative parental populations. While autosomal STRs and mtDNA results clearly suggest Khasi origin of the Lyngngam, Y-STR distances show greater proximity of Lyngngam to the Garo. Further, the comparative analysis of the Y-Chromosome and mtDNA haplogroup data on relevant Austro-Asiatic and Tibeto-Burman populations from South and Southeast Asia, published by us earlier, clearly exclude the possibility of Lyngngam origin from outside Meghalaya. The molecular genetic evidence in conjunction with the linguistic, demographic and ethno-historic information clearly suggests Khasi origin of the Lyngngam tribe.

KEYWORDS

Austro-Asiatics; Admixture; Autosomal STRs; Y-Chromosome Markers; MtDNA HVS-I and II Sequences

Cite this paper

Langstieh, B. , Kumar, V. , Aruna, M. , Reddy, A. , Dasgupta, S. , Nirmala, A. , Thangaraj, K. , Singh, L. & Reddy, B. (2012). Molecular Genetic Perspectives on the Origin of the Lyngngam Tribe of Meghalaya, India. *Advances in Anthropology*, 2, 181-197. doi: 10.4236/aa.2012.24021.

References

- [1] Ahmed, T. J., Sengupta, S., & Ghosh, A. K. (1997). A genetic study on the Lyngam of Meghalaya. *Journal of Human Ecology*, 8, 473-475.
- [2] Andrews, R. N., Kubacka, I., Chinnery, P. F., Lightowlers, R. N., Turnbull, D. M., & Howell, N. (1999). Reanalysis and revision of the Cambridge reference sequence for human mitochondrial DNA. *Nature Genetics*, 23, 147. doi:10.1038/7727
- [3] Applied Biosystems. (2001). PCR protocols for AmpF?STR profiler plus. PE applied biosystems human identification group. Foster City, CA: Applied Biosystems.
- [4] Bareh, H. (1967). The history and culture of the Khasi people. Guahati: Spectrum Publications.
- [5] Barrett, D. (1982). World christian encyclopedia. New York.
- [6] Bertorelle, G., & Excoffier, L. (1998). Inferring admixture proportions from molecular data. *Molecular Biology and Evolution*, 15, 12981311. doi:10.1093/oxfordjournals.molbev.a025858
- [7] Bhattacharjee, J. B. (1978). The Garos and the English. New Delhi: Radiant Publishers.

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[AA Subscription](#)[Most popular papers in AA](#)[About AA News](#)[Frequently Asked Questions](#)[Recommend to Peers](#)[Recommend to Library](#)[Contact Us](#)

Downloads:	24,579
------------	--------

Visits:	122,646
---------	---------

[Sponsors >>](#)

- [8] Butler, J. M., Schoske, R., Vallone, P. M., Kline, M. C., Redd, A. J. et al. (2002). A novel multiplex for simultaneous amplification of 20 Y-chromosome STR markers. *Forensic Science International*, 129, 10-24. doi:10.1016/S0379-0738(02)00195-0
- [9] Cann, R. L., Stoneking, M., & Wilson, A. C. (1987). Mitochondrial DNA and human evolution. *Nature*, 325, 31-36. doi:10.1038/325031a0
- [10] Chakraborty, R. (1986). Gene admixture in human populations: Models and predictions. *Yearbook of Physical Anthropology* 29, 1-43. doi:10.1002/ajpa.1330290502
- [11] Chu, J. Y., Huang, W., Kuang, S. Q., Wang, J. M., Xu, J. J., Chu, Z. T., Yang, Z. Q., Lin, K. Q., Li, P., Wu, M., Geng, Z. C., Tan, C. C., Du, R. F., & Jin, L. (1998). Genetic relationship of populations in China. *Proceedings of the National Academy of Sciences*, 95, 11763-11768. doi:10.1073/pnas.95.20.11763
- [12] Clark, V. J., Sivendran, S., Saha, N., Bentley, G. R., Aunger, R., Sirajuddin, S. M., & Stoneking, M. (2000). The 9-bp deletion between the mitochondrial Lysine tRNA and COII genes in tribal populations of India. *Human Biology*, 72, 273-285.
- [13] Cordaux, R., Saha, N., Bentley, G. R., Aunger, R., Sirajuddin, S. M., & Stoneking, M. (2003). Mitochondrial DNA analysis reveals diverse histories of tribal populations from India. *European Journal of Human Genetics*, 11, 253-264. doi:10.1038/sj.ejhg.5200949
- [14] Cordaux, R., Weiss, G., Saha, N., & Stoneking, M. (2003). The Northeast Indian passageway: A barrier or corridor for human migrations? *Molecular Biology and Evolution*, 21, 1525-1533. doi:10.1093/molbev/msh151
- [15] Crawford, M. H., Reddy, B. M., Martinez-Laso, J., Mack, S., Erlich, H. (2001). Genetic variation among the Golla pastoral caste subdivisions of Andhra Pradesh, India: HLA system. *Human Immunology*, 62, 1031-1041. doi:10.1016/S0198-8859(01)00312-3
- [16] Diffloth, G. (2005). The contribution of linguistic palaeontology to the homeland of Austro-Asiatic. In L. Sagart, R. Blench, & A. Sanchez-Mazas (Eds.), *The Peopling of East Asia: Putting Together Archaeology, Linguistics and Genetics* (pp. 77-81). London: Routledge Curzon.
- [17] Dipierri, J. E., Alfaro, E., Martínez-Marignac, V. L., Bailliet, G., Bravi, C. M., Cejas, S., & Bianchi, N. (1998). Paternal directional mating in two Amerindian subpopulations located at different altitudes in northwestern Argentina. *Human Biology*, 70, 1001-1010.
- [18] Dupanloup, I., & Bertorelle, G. (2000). Computing admixture coefficients from molecular data. <http://cmpg.unibe.ch/software/admix/>
- [19] Dutta, R., Reddy, B. M., Chattopadhyay, P., Kashyap, V. K., Sun, G., & Deka, R. (2002). Patterns of genetic diversity at the 9 forensically approved STR loci among the Indian populations. *Human Biology*, 74, 33-49. doi:10.1353/hub.2002.0002
- [20] Ehrenfels, U. R. (1955). Three matrilineal groups of Assam. *American Anthropologist*, 57, 306-321. doi:10.1525/aa.1955.57.2.02a00080
- [21] Grierson, G. A. (1928). The Mon-Khmer family. In G. A. Grierson, (Ed.) *Languages of North Eastern India—A Survey* (pp. 1-57). New Delhi: Gian Publishing House.
- [22] Gurdon, P. R. T. (1907). *The Khasis*. New Delhi: Low Price Publication.
- [23] Hussain, Z. (1991). Who are the pre-historic dwellers of the Meghalaya plateau? In J. P. Singh, & G. Sengupta, (Eds.), *Archaeology of North East India* (pp. 74-85). New Delhi: Vikas Publishing House Pvt. Ltd.
- [24] Jorde, L. B., Rodgers, A. R., Bamshad, M., Watkins, W. S., Krakowiak, P., Sung, S., Kere, J., & Harpending, H. C. (1997). Microsatellite diversity and the demographic history of modern humans. *Proceedings of the National Academy of Sciences*, 94, 3100-3103. doi:10.1073/pnas.94.7.3100
- [25] Karve, I. & Dandekar, V. M. (1951). *Anthropometric measurements of Maharashtra*. Deccan College Monograph Series 8.
- [26] Karve, I., & Malhotra, K. C. (1968). Biological comparison of eight endogamous groups of the same rank. *Current Anthropology*, 9, 109-124. doi:10.1086/200976
- [27] Karve, I. (1961). *Hindu society, an interpretation*. Poona: Deccan College.
- [28] Kittles, R. A., Bergen, A. W., Urbanek, M., Virkkunen, M., Linnoila, M., Goldman, D. & Long, J. (1999).

Autosomal, mitochondrial and Y chromosome DNA variation in Finland: Evidence for a male-specific bottleneck. *American Journal of Physical Anthropology*, 108, 381-399. doi:10.1002/(SICI)1096-8644(199904)108:4<381::AID-AJPA1>3.0.CO;2-5

- [29] Kivisild, T., Bamshad, M. J., Kaldma, K., Metspalu, M., Metspalu, E., Reidla, M., Laos, S., Parik, J., Watkins, W. S., Dixon, M. E., Papiha, S. S., Mastana, S. S., Mir, M. R., Ferak, V., & Villems, R. (1999). Deep common ancestry of Indian and Western Eurasian mitochondrial DNA lineages. *Current Biology*, 9, 1331-1334. doi:10.1016/S0960-9822(00)80057-3
- [30] Kivisild, T., Rootsi, S., Metspalu, M., Mastana, S., Kaldma, K., Parik, J., Metspalu, E., Adojaan, M., Tolk, H. V., Stepanov, V., Golge, M., Usanga, E., Papiha, S. S., Cinnioglu, C., King, R., Cavalli-Sforza, L., Underhill, P. A., & Villems, R. (2003). The genetic heritage of the earliest settlers persists both in Indian tribal and caste populations. *American Journal of Human Genetics*, 72, 313-339. doi:10.1086/346068
- [31] Kivisild, T., Tolk, H. V., Parik, J., Wang, Y., Papiha, S. S., Bandelt, H.-J., & Villems, R. (2002). The emerging limbs and twigs of the East Asian mtDNA tree. *Molecular Biology Evolution*, 19, 1737-1751. doi:10.1093/oxfordjournals.molbev.a003996
- [32] Kong, Q. P., Yao, Y. G., Sun, C., Bandelt, H. J., Zhu, C. L. et al. (2003). Phylogeny of East Asian mitochondrial DNA lineages inferred from complete sequences. *American Journal of Human Genetics*, 73, 671-676. doi:10.1086/377718
- [33] Kumar, V., Basu, D., & Reddy, B. M. (2004). Genetic heterogeneity in northeastern India: Reflection of Tribe-Caste continuum in the genetic structure. *American Journal Human Biology*, 16, 334-345. doi:10.1002/ajhb.20027
- [34] Kumar, V., Reddy, A. N. S., Babu, J. P., Rao, T. N., Langstieh, B. T., Thangaraj, K., Reddy, A. G., Singh, L. & Reddy, B. M. (2007). Y-chromosome evidence suggests a common paternal heritage of Austro-Asiatic populations. *BMC Evolutionary Biology*, 7, 47. doi:10.1186/1471-2148-7-47
- [35] Langstieh, B. T. (2003). Ethnic origin and population structure of the Lyngngam of Meghalaya, India. Ph.D. Thesis, Calcutta: Calcutta University.
- [36] Langstieh, B. T., & Reddy, B. M. (2004a). Ethno-historic and linguistic background of the Lyngngam and its demographic structure. *Journal of North Eastern Hill University*, 2, 15-42.
- [37] Langstieh, B. T., Reddy, B. M., Thangaraj, K., Kumar, V. & Singh, L. (2004b). Genetic diversity and relationships among the tribes of Meghalaya compared to other Indian and Continental populations. *Human Biology*, 76, 569-90. doi:10.1353/hub.2004.0057
- [38] Langstieh, B. T., & Reddy, B. M. (1999). The origin and ethnic position of Lyngngam among the tribes of Meghalaya: An exploratory study. *Journal of Indian Anthropological Society*, 34, 265-275.
- [39] Malhotra, K. C. (1978). Founder effect, gene drift and natural selection among four nomadic Mendelian isolates. In R. J. Meier, et al. (Eds.), *Evolutionary models and studies in human diversity* (pp. 279-314). The Hague: Mouton. doi:10.1515/9783110800043.315
- [40] Malhotra, K. C. (1979). Excommunication as a process leading to the formation of new groups. *The Eastern Anthropologist*, 32, 49-53.
- [41] Malhotra, K. C. (1984). Population structure among the Dhangar castecluster of Maharashtra, India. In J. R. Lukacs (Ed.), *The People of South Asia* (pp. 295-324). New York: Plenum Press.
- [42] Malhotra, K. C., & Vasulu, T. S. (1993). Structure of human populations in India. In P. P. Majumder (Ed.), *Human Population Genetics* (pp. 207-233). New York: Plenum Press. doi:10.1007/978-1-4615-2970-5_15
- [43] Mathur, P. R. (1979). *The Khasi of Meghalaya*. New Delhi: Cosmo.
- [44] Mitchell, R. J., Reddy, B. M., Campo, D., Infantino, T., Kaps, M., and Crawford, M.H. (2006). Genetic diversity within a caste population of India as measured by Y chromosome haplogroups and haplotypes: sub-castes of the Golla of Andhra Pradesh. *American Journal of Physical Anthropology*, 130, 385-393. doi:10.1002/ajpa.20329
- [45] Nei, M., Tajima, F., & Tateno, Y. (1983). Accuracy of estimated phylogenetic trees from molecular data. *Journal of Molecular Evolution*, 19, 153-170. doi:10.1007/BF02300753
- [46] Nongsiang, E. D. (1994). Various forms of festivals and ceremonies of the Lyngngams. In K. R. Marak, & R. Wankhar (Eds.), *Festivals and Ceremonies in Meghalaya* (pp 120-123). Shillong: Dept. of Art and

- [47] Playfair, A. (1909). The Garos. Gauhati: United Publishers, Reprint 1975.
- [48] Reddy, B. M. (1983). Temporal trends in marriage distance and village endogamy among the migrant groups of fishermen of coastal Orissa. *Collagium Anthropologicum*, 7, 125-135.
- [49] Reddy, B. M. (1984). Demographic structure of the migrant groups of fishermen of Puri coast, India. *Journal of Biosocial Sciences*, 16, 385-398. doi: 10.1017/S0021932000015200
- [50] Reddy, B. M. (2010). Population structure and genetic perspectives on the Indian fishermen. In M. K. Bhasin, & C. Sussane (Eds.), *Anthropology Today: Trends and Scope of Human Biology*. *Anthropologist*, 6, 165-181.
- [51] Reddy, B. M., Chopra, V. P., Rodewaldt, A., Dey, B., Veerajju, P., & Rao, T. V. (1995). Genetic affinities between migrant and parental populations of fishermen on the east coast of India. *American Journal of Human Biology*, 7, 51-63. doi: 10.1002/ajhb.1310070108
- [52] Reddy, B. M. & Chopra, V. P. (1999). Biological affinities between the parental and migrant populations of fishermen of the East coast of India. *Human Biology*, 71, 803-822.
- [53] Reddy, B. M., Sun, G., Javier, R. L., Crawford, M. H., Hemam, N. S., & Deka, R. (2001a). Genomic diversity at the 13 STR loci among the 7 subcastes of the substructured Golla population of southern Andhra Pradesh, India. *Human Biology*, 73, 175-190. doi: 10.1353/hub.2001.0025
- [54] Reddy, B. M., Demarchi, D. A. & Malhotra, K. C. (2001b). Patterns of variation in a caste-cluster of Dhangars of Maharashtra, India. *Collagium Antropologicum*, 25, 425-442.
- [55] Reddy, B. M., Pfeiffer, A., Crawford, M. H. & Langstieh, B. T. (2001). Population substructure and patterns of quantitative variation among the Gollas of southern Andhra Pradesh, India. *Human Biology*, 73, 291-306. doi: 10.1353/hub.2001.0026
- [56] Reddy, B. M., Naidu, V. M., Madhavi, V. K., Thangaraj, K., Kumar, V., Langstieh, B. T., Venkatramana, P. V., Reddy, A. G., & Singh, L. (2005). Microsatellite diversity in Andhra Pradesh, India: Genetic stratification versus social stratification. *Human Biology*, 77, 803-823. doi: 10.1353/hub.2006.0018
- [57] Reddy, B. M., Langstieh, B. T., Kumar, V., Nagaraja, T., Aruna, M., Thangaraj, K., Reddy, A. N. S., Reddy, A. G., & Singh, L. (2007). Austro-asiatic tribes of northeast India provide missing genetic link between south and Southeast Asia. *PLoS One*, 2, e1141.
- [58] Reddy, B. M., Tripathy, V., Kumar, V., & Nirmala, A. (2010). Molecular genetic perspectives on the Indian social structure. *American Journal of Human Biology*, 22, 410-417. doi: 10.1002/ajhb.20983
- [59] Relethford, J. H. (1993). *MANTEL for Windows version 2.0*.
- [60] Rodborne, T. (1977). *U Khasi*. Shillong, Meghalaya, Shillong: Mrs. H. Rodborne.
- [61] Sambrook, J., Fritsch, E. F., & Maniatis, T. (1989). *Molecular cloning: A laboratory manual*. 2nd Edition. New York: Cold Spring Harbor Laboratory Press.
- [62] Sangma, M. S. (1981). *History and Culture of the Garos*. New Delhi: Cosmo Publishing.