Human Biology of Afro-Caribbean Populations

Lorena Madrigal provides a microevolutionary study of Caribbean populations of African descent, reviewing the conditions endured by the slaves during their passage and in the plantations and how these may have affected their own health and that of their descendents. The book provides an evolutionary framework for understanding the epidemiology of common modern-day diseases such as obesity, hypertension, and diabetes, and in addition looks at infectious diseases and their effect on the genetic make-up of Afro-Caribbean populations. It also reviews population genetics studies that have been used to understand the microevolutionary pathways for various populations and investigates their demographic characteristics, including the relationships between migration, family type, and fertility. Ending with a case study of the Afro-Caribbean population of Limón, Costa Rica, this will be a fascinating resource for researchers working in biological anthropology, demography, and epidemiology, and for those interested in the African diaspora in the New World.

LORENA MADRIGAL is Professor in the Department of Anthropology at the University of South Florida and has worked on historical demography, population genetics, disease and modernization, and the genetics of longevity. She has also published *Statistics for Anthropology* (Cambridge, 1998).

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Para mis tres amores: Guido, Sofía y Nadia.

To the people of Limón: may they achieve what they deserve, without losing their beautiful culture.

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Foreword

MICHAEL H. CRAWFORD, *University of Kansas*

In the mid nineteenth century an American adventurer, diplomat, archaeologist, and newspaper editor (E.G. Squier, who wrote under the pseudonym of S.A. Bard), while exploring the Miskito coast of Honduras, described the Black Caribs living in the region as: "Most are pure Indians, not large, but muscular, with a ruddy skin, and long straight hair" (Bard, 1855, p.317). Similarly, British administrator, Thomas Young (1847, p.123), observed extensive variability among the Black Caribs: "some being coal black, others nearly as yellow as Saffron."

In the 1970s, having read these graphic descriptions about the Black Caribs (also known as the Garifuna), I expected to see a Native American group similar to one I had observed earlier in Mexico. The Black Caribs originated on St. Vincent Island during the seventeenth century and, after a rebellion, were deported by the British to Roatan of the Bay Islands in 1798. In the following year, the Spanish transported the majority of the newly relocated Black Caribs from the Bay Islands to the coast of Central America. Almost 135 years later, when I arrived in Livingston, Guatemala (a sleepy Black Carib coastal village, nestled against the edge of a tropical forest), I was shocked to see a scene that could only have been "staged" in West Africa. The Garifuna were extremely dark with few morphological characteristics suggestive of Native American origins. They were trading in a market that could have been located anywhere along the Gold Coast of Africa. This did not make much sense! What happened to the Carib Indians who had been deported 177 years earlier from St. Vincent? If the dissidents of St. Vincent Island had been deported selectively to Roatan on the basis of their African features, then Young and Squier should have observed, in the 1850s a predominantly African population in Central America. This was not the case. The most probable answer to this puzzle lies in the history of the Garifuna.

The Rise of the Garifuna

The Caribbean Islands were settled originally by Arawak Indians who had expanded demically from South America in approximately AD 100. This initial settlement was followed approximately 1000 years later by the diffusion of Carib Indians from South America into the Lesser Antilles. Following Contact with Europeans, the native populations of the Caribbean islands experienced a dramatic numerical decline. At Contact, the total aboriginal population of the Caribbean islands was estimated by Cook and Borah (1971) to be approximately 6 million persons. Within 100 years of Contact, as a result of epidemics, warfare, and slavery, many of the islands were totally devoid of Amerindians. A few Amerindian enclaves persisted into the seventeenth and eighteenth centuries on Dominica and St. Vincent, while most of islands saw the tragic disappearance of their Native American residents. With the importation of slaves into centers such as Barbados, the African component was added to the St. Vincent gene pool in the seventeenth century as a result of the sinking of a slaver from Benin and some escapees from the adjoining island of Barbados. Due to a revolt against the British by the inhabitants of St. Vincent Island (possibly inspired by the French), all but a few Black Carib families were deported by the British Navy to the Island of Roatan, off the coast of Honduras in Central America. The Spanish Crown, notified of the presence of a hostile army on their colonial possessions, immediately deployed their military to investigate. On arrival, they learned that the Black Caribs were peaceful and preferred passage to the coast of Central America, which was gladly provided.

Upon arrival in Honduras, the Black Caribs rapidly spread out geographically from a single village to the present 54 communities, distributed over 1000km of Central American coastline from Dangriga, Belize to La Fe, Nicaragua. Numerically, they have expanded in Central America from fewer than 2000 persons in 1800 to more than 70,0000 persons by 1980 (Crawford, 1983). The success of the Black Caribs in colonizing the Central American coast is not only impressive due to their sheer numbers, but because they were able to survive in an inhospitable region plagued by malaria, brought earlier by infected Africans. In this evolutionary success story, the Carib/Arawak genes from St. Vincent were preserved in Central America, "packaged" with African phenotypes. The numerical success of the Black Caribs can be explained not only by the presence of a large African genetic component but also by

the extractive efficiency of Arawak/Carib Indian culture. Because of their African and Native American ancestry, the Black Caribs possess exceptionally high genetic variation and a number of genetic adaptations to malaria. These adaptations were the result of their residence in malarial environments in Africa for thousands of years before coming to St. Vincent Island and the malaria-infested Central American coast (Crawford, 1998).

What does this history have to do with the conflicting reports from the mid nineteenth century of the Amerindian appearance of the Garifuna in Central America in contrast to my observations of an African population, approximately 125 years later? There are two possible explanations. (1) Since the 1850s the Black Caribs could have intermixed with a variety of populations of predominantly African ancestry, brought earlier to Central America to labor on the fruit and sugar plantations. As a result of this gene flow, the Garifuna of 1975 resembled African populations more closely and indeed exhibited African admixture estimates of 70% to 80% (Schanfield *et al.*, 1984). (2) The transplanted, admixed population of Carib/Arawak and African may have experienced the effects of natural selection on the coast of Central America. Did selection favor those individuals with hemoglobinopathies (AS and AC), G-6-PD deficiency, and the absence of the Duffy chemokine receptor (FY^*0), or specific gamma globulin markers brought from Africa? These regions of the genome, protective against malaria and bearing the molecular signature of natural selection, would more likely be found in individuals of African ancestry who would survive their encounters with *Plasmodium falciparum*, and their genes would be present disproportionately in subsequent generations. In her dissertation, Lorena Madrigal-Diaz (1988) explored differential fertility as a mechanism of selection in a cohort of Afro-American women residing in Limón, Costa Rica. She concluded that differential fertility of women with hemoglobinopathies (Hb AS) in a malarial environment cannot maintain the balanced polymorphism but that differential mortality better explains the evidence for selection.

This volume by Lorena Madrigal examines the complexities of health, population genetics, and demography of the descendants of the African slaves imported into the Caribbean Islands and into some regions of Central America. In the initial phases of slavery in the Americas, African slaves came primarily from West and Central Africa. In the later phases of slavery the southeastern and the western regions of Africa were also raided for slaves. Thus, the slave populations in the Caribbean were highly heterogeneous, both culturally and genetically, and contained enormous biodiversity – a reflection of the antiquity of human habitation

in Africa. In addition to the rich genetic variation brought from Africa, the descendants of the slave populations also interbred with Native Americans, and Europeans. There is considerable variation in the degree of African, Native American, and European admixture seen on various islands of the Caribbean and along the Atlantic coast of Central America. Varying degrees of African, Native American, and European admixture in these Caribbean populations complicate any analyses of risk factors for chronic diseases associated with specific ethnicity.

Lorena Madrigal has been conducting research on the genetics and demography of the descendants of African populations of Central America since her graduate school days at the University of Kansas. Her dissertation focused on the community of Limón, Costa Rica and she has continued working in Central America for almost two decades. Her background and training have qualified her uniquely to write this highly complex history, demography, and genetics of the descendants of the African slaves of the Caribbean. The examination of the genetic and disease patterns of African populations against a backdrop of history and demography allows Professor Madrigal to weave a rich biocultural tapestry, highlighting the unique patterns of human evolution in the Caribbean and Central America.

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