

Genetic Perspectives on the pre- and Early Contact Histories of Jamaica

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Archeological work in Jamaica has provided great insights into the history of human habitation on the island. As detailed in previous literature and in this volume's accompanying articles, analysis of material culture in Jamaica has illustrated dynamic environments and complex socioeconomic systems marked by interaction and exchange of goods and ideas. However, there are still many open questions regarding the origins, timing, and routes used to populate the island as well as the biological relationships between Circum-Caribbean peoples and the initial migrants to Jamaica. Regarding the contact period, there is still much to be learned about the biological impacts of European colonialism and African chattel slavery on the demography of Jamaican populations, including the potential for Afro-Indigenous interactions on the island. Genomic approaches offer novel opportunities to address these types of questions. After presenting genetic anthropological research about Jamaican pre- and post-contact peoples, we comment on the potential of genomic approaches to enhance questions of archeological significance. Ultimately, interdisciplinary approaches incorporating archeology, bioarcheology, and genetic will be critical for a more holistic understanding of Jamaica's deep past.

Les travaux archéologiques menés en Jamaïque ont permis de mieux comprendre l'histoire d'habitation humaine sur l'île. Dans des précédentes recherches et dans les articles de ce volume, l'analyse de la culture matérielle en Jamaïque a illustré des environnements dynamiques et des systèmes socio-économiques complexes marqués par l'interaction et l'échange de biens et d'idées. Cependant, de nombreuses questions restent en suspens concernant les origines, les périodes et les routes utilisées pour peupler l'île, ainsi que les relations biologiques entre les peuples des Caraïbes circumpolaires et les premiers migrants en Jamaïque. En ce qui concerne la période de contact, il reste encore beaucoup à apprendre sur les impacts biologiques du colonialisme européen et de l'esclavage des africains sur la démographie des populations jamaïcaines, y compris sur le potentiel d'interactions afro-indigènes sur l'île. Les approches génomiques offrent de nouvelles possibilités d'aborder ce type de questions. Après avoir présenté la recherche anthropologique génétique sur les peuples jamaïcains avant et après le contact, nous commentons le potentiel des approches génomiques pour améliorer les questions d'importance archéologique. En définitive, les approches interdisciplinaires intégrant l'archéologie, la bioarchéologie et la génétique seront essentielles pour une compréhension plus holistique du passé profond de la Jamaïque.

Los trabajos arqueológicos realizados en Jamaica han permitido comprender mejor la historia de los asentamientos humanos en la isla. En investigaciones anteriores y en los trabajos de este volumen, el análisis de la cultura material en Jamaica ha ilustrado entornos dinámicos y complejos sistemas socioeconómicos marcados por la interacción y el intercambio de bienes e ideas. Sin embargo, aún quedan muchos interrogantes sobre los orígenes, los periodos y las rutas utilizadas para poblar la isla, así como sobre las relaciones biológicas entre los pueblos circumpolares del Caribe y los primeros emigrantes asentados en Jamaica. Con respecto al periodo de contacto, queda mucho por aprender sobre los impactos biológicos del colonialismo europeo y de la esclavitud africana en la demografía de las poblaciones jamaicanas, incluyendo las potenciales interacciones afro-indígenas en la isla. Los enfoques genómicos ofrecen nuevas oportunidades para abordar estas cuestiones. Tras presentar la investigación antropológica genética sobre los pueblos jamaicanos anteriores y posteriores al contacto, comentamos el potencial de los enfoques genómicos para responder mejor a preguntas de importancia arqueológica. En última instancia, los enfoques interdisciplinarios que integran la arqueología, la bioarqueología y la genética serán esenciales para una comprensión más holística del pasado profundo de Jamaica.

Introduction

In summer 2019, 500 years after the fall of the last *Kasike* or traditional leader of Jamaica's (*Yamaye*) Indigenous community, Robert Pairman (*Kasike Nibonrix Kaiman*) formally accepted the title and role of *Kasike*. As reported by Paul Williams, a writer for the *Jamaica Gleaner*, the crowning of *Kaiman* took place in a two-hour ceremony within the Charles Town Maroon village in Portland, Jamaica. The ceremony was led by the Grandmother's Circle of the *Bohío Atabei Mujeres De La Yukka y el Jaguar*, an Indigenous women's association with leaders from Puerto Rico (*Boriken*). The installation of Pairman as *Kasike*, is reminiscent of another related story about Jamaica's Indigenous legacy published five years prior, also in *The Gleaner*. In this earlier two-part report, titled "I am not extinct," Williams chronicles some of the lived experiences regarding social marginalization and discrimination of Olive Moxam-Dennis and her child, Dr. Erica Neeganagwedgin, both of whom identify as Jamaican Taíno. Based upon reaction to both these stories, as detailed in social media and even in academic writings, the idea of Indigenous Caribbean extinction or conversely, continuity, remains contentious, rife with anti-Black critiques, antiquated ideas about race and hypodescent, as well as varied interpretations of kinship and community (Benn Torres 2014; Fuller and Benn Torres 2018).

The events detailed in *The Gleaner* can be considered an outgrowth of Caribbean Indigenous resurgence movements that have gained momentum within the last two decades. A variety of countries including of Trinidad and Tobago, St. Vincent, Dominica, Puerto Rico, the Dominican Republic, and Jamaica, to name a few, are places where community activists have worked toward building government recognition and public acknowledgment of the presence and persistence of Indigenous Caribbean peoples (Davidas 1998; Forte 2006; Guitar et al. 2006; Ingram 2009; La Rose 2011; Leland 2014; Matthei and Smith 2008). In the first decade of the 2000s, scholars began to apply modern molecular genetic techniques in efforts to learn more about admixture within island populations (Benn Torres et al. 2007; Lalueza-Fox et al. 2001, 2003; Martínez Cruzado et al. 2001, 2005;

Molokhia et al. 2003). These studies illustrated the impact of Indigenous Caribbean genetic legacies on shaping the genetic diversity of contemporary Caribbean populations. How genetic perspectives align with resurgence movements or the critics of these movements, appears to vary in relation to historic and cultural idiosyncrasies of each stakeholder community (Abel 2018; Benn Torres 2014; Feliciano-Santos 2019). The circumstances and controversy surrounding Jamaican Indigenous resurgence movements and the place of African descendants within or adjacent to that movement reflects larger issues about the complexities of historical interpretation as well as complexity in ideologies of kinship, relatedness, and community continuity.

As this relates to genetic data, for over twenty years, the application of genomic technologies has been marketed by academics and genetic testing companies as potentially useful for learning about relationships to ancestral populations as well as individual genealogical histories (Bardill 2018; Bolnick et al. 2007; Duster 2011; Nelson 2008). As discussed elsewhere, the increasingly ubiquitous access to genetic technologies to address questions about biogeographical origins and admixture in African descendant communities, does not necessarily settle any questions, but in fact may complicate the ways that people think about themselves, their communities, and their obligations to these communities (Benn Torres 2014, 2018; Benn Torres and Torres Colón 2021). Despite the limitations and controversies of using DNA to reimagine the past and address questions of identity, genetic approaches have been useful for adding new perspectives on the biogeographic origins and ethnogenesis of Caribbean populations (Benn Torres et al. 2008; Moreno-Estrada et al. 2013; Schroeder et al. 2018). In this article, we review what the application of genetic, and increasingly, genomic technologies offer to our understanding of pre- and early contact histories of Jamaica's people. As part of this discussion, we highlight how genetic perspectives adds to or complements archeological studies of Jamaica's past. In addition to reviewing what has been learned using genetics, we also comment on what future studies, particularly those using ancient DNA,

might offer to addressing open questions about Jamaica's first inhabitants as well as the history of African descendants on the island. Finally, we end the article with some commentary surrounding the interpretive limitations of genetic work in a Caribbean context.

Precontact Jamaica

To date, there have been no studies that directly assess the genetic legacies of precontact peoples on Jamaica using ancient DNA (aDNA). The climate, preservation conditions, and other environmental factors make preservation of human remains that are suitable for ancient genomic analysis difficult to find and analyze. However, due to improving genomic technologies, such as next-generation-sequencing and newer technologies that allow for longer sequence reads, collectively known as third-generation sequencing (Cook 2020; Pickrell et al. 2012), the possibility of aDNA research in a Jamaican context are now more possible. Much of what we know about the precontact Caribbean comes from aDNA studies that have been conducted with remains from other islands including Cuba, the Bahamas, Hispaniola, Puerto Rico, St. Martin, Guadeloupe, Trinidad, Curaçao, and the Circum-Caribbean region including Venezuela (Fernandes et al. 2021; Nägele et al. 2020; Nieves-Colón 2019; Reid 2018).

For the most part, aDNA studies of precontact Caribbean people suggest that the Caribbean was inhabited in a series of dispersals, some of which are known to have originated in the South American continent. One of the larger comprehensive aDNA studies, involving 93 ancient individuals from 16 archeological sites drawn from five islands, suggests that there were three major dispersals into the Antilles (Nägele et al. 2020). The first of these dispersals events was associated with peopling of the western Caribbean by “Archaic-related”¹ people. Though the exact origin of this dispersal event is unclear, it seem to be associated with, “radiation events in North America before the diversification of

Central and South Americans” (Nägele et al. 2020:3). The latter two dispersal events occurred after 2800 BP and are thought to have originated from people from the Orinoco River Basin. Based on the available data, Nägele et al. (2020) indicate that the genomic data best support a dispersal model in which migrants island-hopped from the south to north. Furthermore, they found that these later migrants did not intermix much with the earliest inhabitants. This lack of admixture creates open questions about the nature of the dispersal events and relationship between earlier and later migrant groups. Open question such as this and others regarding the estimated number of people inhabiting the ancient Caribbean, the biological relationships within and between various islander communities, genetic adaptations to local environments, as well as the characterizations of human-microbe interactions all remain possible topics to explore in the future as additional ancestral individuals from across the Caribbean are included in genomic work.

Contact Jamaica

The initial contact between conquistadors under the aegis of Spain and Indigenous Caribbean peoples in Jamaica occurred in 1494. By 1509-1510, the Spanish established a settlement on the island, named *Sevilla la Nueva*, with intentions to extract gold, other natural resources, and to protect the Spanish claims to the island. As part of the Spanish colonization project, Catholic missionaries also participated in colonization efforts by converting Indigenous populations to Catholicism (Woodward 2006). When it was found that gold mining was not profitable on the island, the settlement was used for cattle ranching and was ultimately abandoned by 1534 (Speller et al. 2013). The initial Spanish colonization of Jamaica included African descendants, not all of whom were enslaved peoples. In fact, some of the earliest Spanish incursions into the Caribbean included people of African descent that had been fully acculturated into Spanish society (Landers

¹ As discussed in the supplementary materials in (Nägele et al. 2020), the terms “Archaic” and “Ceramic” when used to reference people and in a genomic context is inaccurate because it ignores the complexities and variety of cultural attributes and

lifeways enacted by these ancient populations. Regardless, these terms are used to distinguish earlier Indigenous settlers from later Indigenous settlers that inhabited the islands.

1997). According to David Wheat, “Latinized” Africans or *ladinos* were critical in facilitating Spanish settlements in the Caribbean (Wheat 2016:19). Indigenous Caribbean populations were initially the primary labor force fueling Spanish colonization efforts. However, within decades, the numbers of available Indigenous laborers had dwindled, due to overwork, genocide, forced relocations, resistance, and maroonage. To fill gaps in the labor market, Spanish settler-colonists began to import enslaved Africans to build their Caribbean colonies.

Archival records indicate that some of the earliest enslaved African arrivals to Jamaica came from the Angola region of western Africa. Furthermore, these early influxes of western Africans were driven by warfare that was facilitated by Spanish and Portuguese interlopers. As the Spanish settlement grew in Jamaica and elsewhere in the Caribbean, African labor was used in four agricultural or extractive industries - - sugar, mining, pearl fisheries, and commercial ports. However, by the later parts of the 16th century onward the economy changed within the Spanish Caribbean resulting in a change in the

types of labor in which enslaved African and African descendants were involved (Wheat 2016). In addition, with the arrival and settlement of the English in Jamaica, in 1655, there were more changes to the economy and types of labor that involved enslaved Africans (Emmer and Carrera Damas 1999). During this period, English slave traders procured enslaved Africans in accordance to market preferences, and as argued by Audra Diptee (2010), privileged health and quality of captives in order to maximize profit. Based on shipping records and other archival sources, the majority of enslaved Africans that were forcibly transported to Jamaica appear to have come from the Gold Coast/Slave Coast region of western Africa (Hall 2005) (**Figure 1**). After the mid-18th century, however, it seems that many enslaved Africans that ended up in Jamaica and other Anglophone colonies came from regions within the Bight of Biafra (Higman 1984). These historical records indicate that social, political, and economic factors shaped how African labor was used and consequently, impacted who was enslaved as well as the cultural influences that flourished among African descendants in Jamaica.

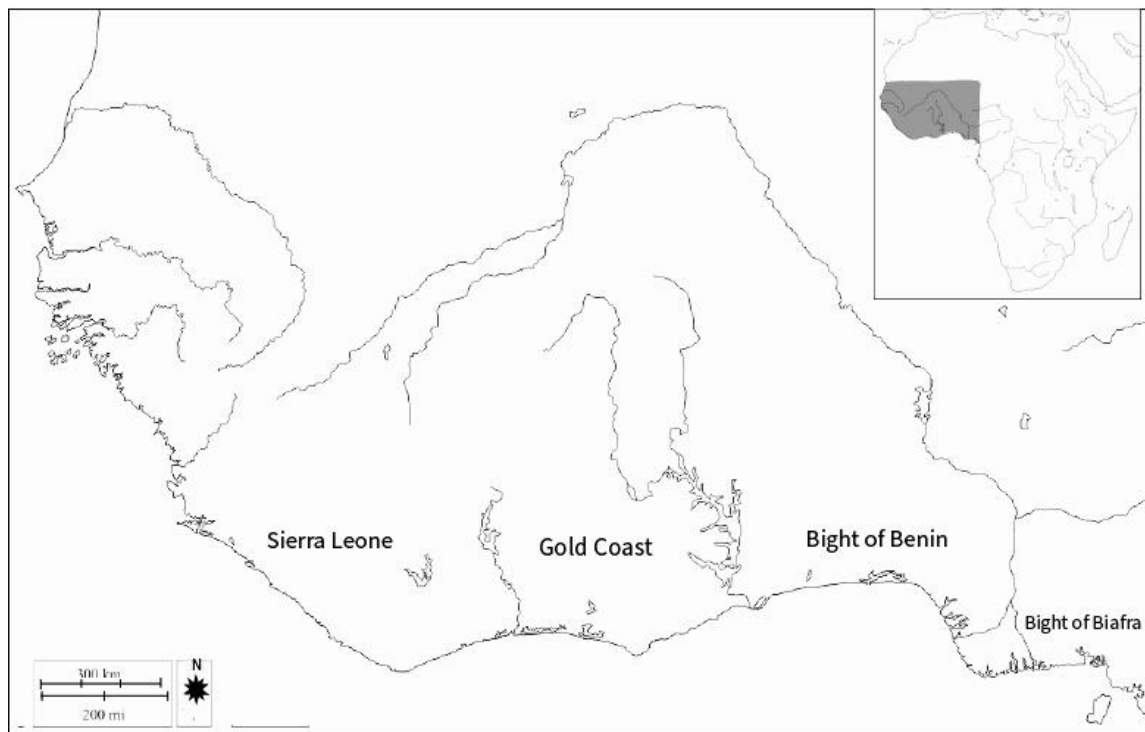


Figure 1. Map of western Africa indicating the major regions of embarkation for enslaved African peoples. Maps were adapted from d-maps.com.

In addition to archival sources, genetic data also have provided some insights into questions about the biogeographic origins of enslaved Africans that ended up in Jamaica as well as the interactions between Africans, African descendants, and Indigenous Caribbean peoples on the island. Genetic perspectives on the histories of African and Indigenous Caribbean populations emanate from scholars working in a number of fields including anthropology, genetics, immunology, and epidemiology for examples see (Ashcroft et al. 2011; Asnani et al. 2008; Creary 2009; Fuller and Benn Torres 2018)). While the purposes of these studies vary, some focusing more on historical phenomenon, others exploring patterns of genetic variation that impact disease risk and susceptibility, many illuminate the biogeographical origins that contribute to the diversity observed in contemporary Jamaicans. Some early research exploring the genetic ancestry of contemporary Jamaicans relied upon classical genetic markers, that is non-DNA biological traits that presumably reflect underlying genetic variation. Classical genetic markers include blood group markers, serum proteins, or major histocompatibility complex markers (MHC), among others (Stoneking 2017). These types of studies typically showed broad patterns of continental ancestry found within Jamaican communities. One early study by Gibbs et al. (1972), examined a trait related to a genetic adaptation against malaria known as G6PD. While they found this trait in a substantial number of Jamaicans in their study attesting to the ancestral connections between West Africa and Jamaica; they also estimated about 89% African and 18% European ancestry in their study group. In another study, Blank and colleagues (1995), genotyped a series of immune related MHC markers in Afro-Colombians and Jamaicans. In this study, Blank and colleagues sampled from two groups of Jamaicans, students and staff from a local hospital and another group consisting of community food handlers. The study concluded that both the Afro-Colombians and Jamaicans, as expected, have African ancestry. They also found that the group of Jamaican food handlers was more genetically similar to reference West African populations. The hospital-based sample was found to have more European admixture and

was more genetical similar to the Afro-Colombians in the study relative to the Jamaican food handlers. This study demonstrated that there is varied genetic ancestries within Jamaicans and further suggests that within the island different community histories and experiences, inclusive of social organization, have resulted in multifaceted patterns of variation between communities. The observation of both substantial African ancestry and that there are genetic differences that delineate subpopulations among African descendants within Jamaica is also found within studies that directly consider genetic data.

Throughout the first two decades of the 2000s, a series of genetic-based studies that included admixture estimates of Jamaicans were published (Benn Torres et al. 2008, 2012; Creary 2009; Deason et al. 2012; Simms et al. 2010, 2013; Vergara et al. 2013). These studies used a variety of markers, both uni- and biparental markers, to quantify African and other continental ancestries in contemporary Jamaica. Uniparental markers are genetic loci that are inherited from only one parent and are informative about a single familial lineage. Mitochondrial DNA and Y chromosome DNA are uniparental markers that are indicative of maternal and paternal ancestry, respectively. Biparental markers, also known as autosomal markers, are genetic markers that are inherited from both parents and consequently are informative about an individual's general ancestry (Benn Torres and Torres Colón 2021). Studies based on mitochondrial data, indicate about 98% African, 0-2% European, and 0-0.5% Native American/Asian maternal ancestry in contemporary Jamaicans. Y chromosome data ranged from 61%-79% African ancestry, 19%-24% European ancestry, and 2%-6% Native American/Asian ancestry along Jamaican patriline. Studies using autosomal markers showed that autosomal African ancestry ranged between 76% and 92%, European ancestry ranged between 1% and 20%, and Asian/ Native American ancestry ranged between 0% and 9% (**Table 1**). Variability of these admixture estimates is likely a product of different sample sizes, different number of ancestry informative markers employed, as well as different sampled

communities within Jamaica. Like the earlier studies using classic genetic markers, these more recent studies also suggest some level of genetic heterogeneity within African descendant communities in Jamaica. This underscores the point that variable patterns of genetic diversity among contemporary Jamaicans is intimately tied to different social histories of Jamaican

communities. In addition to considering the amounts of admixture within Jamaican African descendants, other researchers have attempted to move beyond broad continental origins and instead focused on identifying more specific regions within Africa that are likely ancestral to contemporary Jamaicans.

Table 1. Summary of admixture estimates of Jamaican populations reported in previously published articles. Admixture estimates are presented for biparental (autosomal) and uniparental (mtDNA and Y chromosome) markers. Maximum and minimum values for each ancestral component are indicated. “-” indicate no value was calculated. Abbreviations are as follows: AIMS: Ancestry Informative Marker; STR: Short Tandem Repeats; SNP: Single Nucleotide Polymorphism; HVRI and HVRII: Hypervariable region I and Hypervariable region II.

Ancestry estimates in Jamaica taken from previously published research					
Genetic marker	African (%)	European (%)	Native American/Asian (%)	n	Source
Autosomal Markers					
28 AIMS	84.4	12.4	3.2	54	Benn Torres et al. 2008
105 AIMS	81.4	10.3	8.3	44	Benn Torres et al. 2013
3 AIMS	92.6	7.4	0	178	Creary et al. 2008
3 AIMS	79.2	20.2	0	178	Creary et al. 2008
113,000 SNPs	89	11	1	45	Mathias et al. 2016
10 markers	93	7	-	93	McKeigue et al. 2000
9 AIMS	93.2	6.8	-	102	Parra 1998
15 STRs	78.3	16	5.7	119	Simms et al. 2010; 2012
960,000 SNPs	86.8	12.2	-	688	Chiang et al. 2010
960,000 SNPs	82.2	10.1	-	480	Chiang et al. 2010
237 AIMS	76	14	9	706	Vergara et al. 2012
Maximum	93.2	20.2	9		
Minimum	76	6.8	0		
mitochondrial DNA (mtDNA)					
HVRI and HVRII regions	98.5	1.8	0.005	400	Bukhari et al. 2017
HVRI region	98.1	1.9	0	400	Deason et al. 2012
3 restriction sites	100	0	-	339	McLean et al. 2003
Maximum	100	1.87	0.005		
Minimum	98.1	0	0		
Y chromosome DNA					
177 SNPs	78.6	19.3	2.1	159	Simms et al. 2012
17 STRs	81.4	12.3	6.4	159	Simms et al. 2012
15 STRs	71.1	23.5	5.5	141	Simms et al. 2013
Maximum	81.4	23.5	6.4		
Minimum	71.1	12.3	2.1		

One of the long-term consequences of the Transatlantic Slave trade was the cultural homogenization and dehumanization of enslaved peoples. Enslaved Africans were forcibly migrated and otherwise detached from their natal homes, identities, and their cultural traditions disrupted and forever altered once in the

Americas (Gaspar and Hine 1996; Mintz et al. 1992; Yelvington 2001). Moreover, though heavily resisted, the ability to memorialize and inherit the traditions and histories of their African ancestors was systematically denied by the hegemonic class, creating a void in knowledge about the African origins of African descendants

in Jamaica. Thus, this question of the African origins of Jamaicans has been a long-running question and one that a variety of scholars from different fields have attempted to address. A review of the literature reveals that archeologists, anthropologists, historical demographers, linguists, among others have made great effort to provide insights on the African origins of Jamaicans and other Caribbean peoples (Burnard 2001; DeCamp 1967; Goucher and Agorsah 2011; Higman 1984; Meyers 1999; Mittelsdorf 1978). Even in the last few decades, as the technology has allowed, genetic perspectives have also been used to examine the African origins of Jamaicans. Using a variety of methods, genetic perspectives have offered some insights into the biological relatedness of contemporary Jamaicans and various West African peoples. In the more comprehensive studies, researchers often rely on other lines of evidence, namely information from archeology and archival research, to contextualize genetic findings.

To date, a series of complimentary studies by Deason et al. (2012) and Newman et al. (2013) offer the most comprehensive genetic perspectives on the maternal origins of contemporary Jamaicans. Published in different journals, Deason and colleagues' article details the genetic analyses and Newman and colleagues' article further contextualizes that genetic data within archival and other historical contexts found in the *Slave Voyages* database² (Eltis 2009). The findings of these studies suggest that contemporary Jamaicans are most genetically affiliated along the matriline to peoples in the Gold Coast region of western Africa, though ancestry from the Bight of Benin, Bight of Biafra, and West-Central Africa are also present (**Figure 1**). However, the genetic results were not totally aligned with the archival records in the database. As explained by Newman et al. (2013), the database indicates that more people were taken from Bight of Biafra as opposed to the Gold Coast in the last few decades of legalized

transatlantic trade. The authors offer two explanations for this discrepancy, 1) archival records list the place of embarkation and not actual ethnic or regional origins, and 2) Jamaica was a large slaving port and market where enslaved peoples from Biafra may have been preferentially sold off-island resulting in a disproportion of those that were imported from Biafra and those from other regions of western Africa that remained in Jamaica. Though genetic data offer a novel perspective on the interpretation of historical records, additional ancestry specific analyses, using Y chromosome and autosomal data, are warranted to further explore the historical demography of Jamaicans.

While the abovementioned genetic studies offer additional clues into the histories of African descendants in Jamaica, overall, genetic data should be understood as one of several lines of evidence about the past. As explained elsewhere, genetic studies that attempt to identify the origins of African descendants in the Americas generally approach this question by making systematic comparisons between the relevant reference populations and the descendant group (Benn Torres and Torres Colón 2021). Consequently, ancestry estimates are only as good as the reference populations, where ideally reference populations are well sampled and representative of the descendant group. While correspondence between reference populations and descendant groups provides some notion of biological relatedness and presumably ancestry, there are caveats to such analyses especially in the context of the African diaspora. For example, one should not take for granted that the ethnic labels that identify contemporary people in reference groups existed and were used in similar ways in the past. In addition, depending on the parts of the genome used in making ancestry estimates, inferences about ancestry may be illustrative of only a small proportion of one's ancestry and they made not provide the level of resolution beyond what is

² The *Slave Voyages* database is an online multi-decade, multi-national, multi-intuitional collaborative effort of historians, librarians, cartographers, programmers, and other scholars to document the details of Transatlantic Slave trade voyages. The purpose of the database is make information about the

nature of the Transatlantic Slave trade accessible and encourages new research on this transoceanic trade. This database has been updated several times and accordingly many contributors also changed over time (www.slavevoyages.org/about/about#).

already known. Moreover, due to the overall similarity of all humans and the general human trend that geographically adjacent peoples tend to also be genetically similar, it is exceedingly rare to have a series of genetic markers that can definitively delineate adjacent populations (Ely et al. 2006). Regardless of these caveats, genetic perspectives, as illustrated by the Deason et al. (2012) and Newman et al. (2013) articles, have introduced novel perspectives that allows scholars to re-consider what is known about past and contemporary Jamaicans.

One area in which little is known about the colonial history of Jamaica that genetics has potential to illuminate, is that of Afro-Indigenous Caribbean interaction. Much of what is known about early post-European contact Jamaica tends to derive from the writings of missionaries, travel writers, church records, other archival sources, and archeological studies (Johnson 2003). Apart from archeological observations, these other sources tend to represent a very limited number of perspectives, most notably that of the ruling class. Consequently, phenomena that might have occurred outside of the purview of the ruling class would not be included in their writings and subsequently not part of written historical records. Archeology, however, due to the nature of the discipline in studying material culture of past peoples, can provide additional insights into that which might otherwise be lost or absent in historical records. In the case of Afro-Indigenous interaction, archeologist Professor Emeritus E. Kofi Agorsah and colleagues, have found evidence suggestive of African-descendant and Indigenous Caribbean (Taíno) co-habitation in Jamaica (Goucher and Agorsah 2011). Genetic data offer another means to examine the potential and extent of Afro-Indigenous interaction in Jamaica. Studies of contemporary Jamaican genetic ancestry have found very small amounts of Indigenous Caribbean ancestry within the general populace (Deason et al. 2012; Simms et al. 2010). However, because Indigenous Caribbean ancestry is so rare it is often only mentioned rather than explored in significant depth.

Archeological evidence for African-descendant and Indigenous Caribbean interaction was found at sites where Maroons lived (Goucher and Agorsah 2011). Maroon communities

consisted of individuals who eschewed enslavement establishing formidable semi-autonomous communities within the Jamaican hinterland (Campbell 1977; Carey 1997; Kopytoff 1976, 1978). Descendants of Maroons memorialize this history and embrace their identity as Maroons (Besson 1997; Bilby 2005; Chang 2007; Zips 1999). In addition to material culture, local Maroon histories also note partial ancestry among Jamaica's Indigenous population. An examination of Maroon mitochondrial DNA also supports Afro-Indigenous interaction in Maroon spaces (Fuller and Benn Torres 2018; Madrilejo et al. 2015). Outside of Jamaica, there is also evidence of Afro-Indigenous admixture on other Caribbean countries such as Dominica, St. Vincent, Puerto Rico, Trinidad, Cuba, and the Dominican Republic (Alegre et al. 2007; Benn Torres et al. 2019; Feliciano Velez 2007; Forte 2004; González 1988; Honychurch 1997; Via et al. 2011). Additional studies using both ancient and modern DNA will help to provide more comprehensive understandings about African descendant and Indigenous Caribbean colonial life. Specifically, genetic data may be useful to learn more about the timing, extent, and type of admixture (i.e., sex-biased admixture), between African descendant and Indigenous Caribbean peoples. Such studies would help to illuminate perspectives not easily observed in other resources.

As discussed in this review, genetic data can often complement archaeological and archival records to inform our understanding of the histories of Jamaican peoples more fully. Though it is necessary to contextualize genetic data into broader sociopolitical and historical contexts, genetic data have the potential to offer new insights or at the least ignite new perspectives on open questions. Furthermore, with the arrival of easily accessible direct to consumer (DTC) ancestry tests, the opportunities to incorporate genetic perspectives into discussions about genealogies, community and regional histories will only increase. As more Jamaicans and other Caribbean people participate in genetic ancestry testing, it will be possible to more fully understand the extent of how families were separated during slavery, gain insights into processes of ethnogenesis, as well as gain a

greater appreciation for the genetic interconnectedness between island communities. While there are still many questions that genetic perspectives will be useful to address about Jamaica and the Caribbean more broadly, genetic data should not be privileged over other forms of knowledge and ways of knowing. Due to natural biological processes, such as specific inheritance patterns of uniparental DNA, recombination, et cetera, there are limitations to what genetic data can infer about the past (Benn Torres and Torres Colón 2021). Furthermore, genetic data cannot provide information on social identities, such as race, but rather is informative about the biological relationships between ancestry test takers and

reference groups. While social meanings are often ascribed to different biological phenotypes including genetic markers, genetic markers themselves do not reliably indicate how a person may self-identify. Despite these interpretive limitations of genetic data, there is still much to be learned about the experiences of both Indigenous and African descendants in Jamaica, and due to technological improvements, the potential for ancient DNA within a Jamaican context will only grow. Interdisciplinary approaches incorporating genetic perspectives in combination with continued archival and archeological research will help to answer questions about the complexity and richness of Jamaican history.

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