

SCIENCE

## How Ancient DNA Can Help Recast Colonial History

The people of pre-colonial Puerto Rico did not disappear entirely—a new study shows that the island's residents still carry bits of their DNA.

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GABRIELLA N. BAEZ / REUTERS

In the 15th century, when Europeans first reached the island now named Puerto Rico, it was home to between 30,000 and 70,000 people, sometimes known collectively as Taíno. They came from various ethnic groups descended from several waves of ancestors who came to the island in succession, beginning as early as 3,000 B.C. But a century after the colonizers arrived, official traces of these indigenous peoples were all but impossible to find.

Under a regime of forced relocations, starvation, disease, and slavery, their numbers plummeted. At the same time, colonial officials elided their existence, removing them as a distinct group from the census and recategorizing many—from Christian converts to wives of colonists—as Spanish or “other.”

Those censuses, and other colonial documents, have fueled the common narrative that the indigenous peoples were completely extinguished.

“We’re told our past is a thing that went extinct,” says [Maria Nieves-Colón](#), an anthropological geneticist at Arizona State University. Growing up in Puerto Rico, she heard a different story. Her friends and neighbors would share oral histories about traditions that were passed down to them from Native ancestors, who must somehow have survived to share these customs. In recent years, several groups have pushed a counter-narrative in which indigenous groups were greatly diminished by colonization, but not completely destroyed.

If this were correct, there should be some genetic evidence to back it up. But the only way of finding it would be to examine the DNA of the pre-colonization populations. On this tropical island, ancient DNA, which degrades rapidly in heat and humidity, is hard to come by. But [Nieves-Colón](#) has spent the past

decade [looking for it](#), and her work backs up the counter-narrative.

There was already some genetic evidence to support the idea of Taíno survival. In 2001, Juan Carlos Martínez-Cruzado of the University of Puerto Rico analyzed modern Puerto Ricans and found substantial amounts of Native American ancestry in their mitochondrial genomes—a subset of DNA that's inherited from mothers. "The Taíno contribution to the current population is considerable," he wrote.

*[ Read: [Scientists can now pull the DNA of ancient humans out of cave dirt](#) ]*

But such ancestry can be hard to interpret because European colonizers moved people around. "In contemporary populations, when indigenous ancestry is found, you can only say that it's indigenous to the Americas," says [Jada Benn Torres](#) of Vanderbilt University, who studies the genetic ancestry of indigenous Caribbean peoples. "It's hard to pinpoint it to one particular area." That's why the ancient DNA is necessary.

Over the past 10 years, [Nieves-Colón](#) has been working to wrest tiny fragments of DNA from ancient remains. From three archaeological sites on the island, she and her colleagues acquired 124 skeletal remains, which all dated between A.D. 500 and 1300. They then searched teeth, bones, and dental plaque for genetic fragments—a difficult task, since DNA breaks down quickly and readily in tropical conditions.

Still, the team managed to completely decipher the mitochondrial genomes from 45 precontact people, and partial nuclear genomes from two of them.

These hard-won sequences confirmed that indigenous Puerto Ricans were strongly connected to Amazonian groups from Venezuela and Colombia, and likely originated from that region. They also contained genetic evidence connecting pre-colonial populations with modern ones.

The team found that the 45 ancient mitochondrial genomes fell into 29 distinctive clusters. Most of these have never been detected in modern-day people across the Caribbean, and may well have disappeared. But three of them did survive: They're still around in the genomes of today's Puerto Ricans, and only in Puerto Ricans.

"We wouldn't have expected that if the ancient narrative [of extinction] was completely true," says [Nieves-Colón](#). "These people didn't disappear."

"This shows that there really are ties to populations that are indigenous to the island, and survived through colonization, and are present in modern peoples," adds Benn Torres. "This is something that some people have said all along, based on their oral histories and other ways of knowing."

Many questions remain. [Nieves-Colón](#) wants to work out exactly how much Puerto Rican ancestry comes from precontact predecessors, and whether those groups left traces of ancestry elsewhere in the Caribbean. And "if I had a magic wand, I'd want [ancient] samples from islands all over the Caribbean so we could look at the links between communities," she says. For example, last year a European team sequenced the genome of a [1,000-year-old female skeleton from the Bahamas](#) and found a connection between her DNA and that of some modern Puerto Ricans; perhaps she represented a cousin of the islanders' ancestors.

*[ Read: [Ancient DNA is rewriting human \(and Neanderthal\) history](#) ]*

Ironically, the study of ancient DNA has been criticized for practicing a kind of modern colonialism. Many researchers from Western countries have traveled around the world, grabbing as many samples as they can and performing studies without consulting or involving local communities with ties to those remains. In some cases, the studies have been done against the communities' express wishes. Almost always, they destroy the remains they analyze.

In response, many indigenous scientists and their allies have pushed their peers toward more inclusive and ethical practices, and set up training programs for budding indigenous researchers. Momentum is building, and Nieves-Colón's study, in which a geneticist studies questions that are relevant to her own identity and community, reflects that shift.

"Thinking about who we are and where we came from: These are questions that run through the discourse of the island," she says. "They're personal to me and to most Puerto Ricans."

Agustín Fuentes, an anthropologist from the University of Notre Dame, also praises the team for placing the genetic results within existing archaeological, historical, and anthropological evidence. "It shows how such studies can be done in collaboration with a range of scholars, including those for the regions of interest, and benefit from it," he says. "The explicit recognition of narratives and historical perceptions of Puerto Ricans are taken seriously as aspects of data and context, and the genetic material is not held as the ultimate arbiter of 'reality.' Such an approach should be a central characteristic of the field."

Once the study was complete, Nieves-Colón traveled to Puerto Rico to discuss her findings in public talks and help people work out "how to reconcile their own stories with the science," she says. Some took the results as affirmation of their familial histories, held in the face of prevailing historical narratives. "I don't want to push for genetic essentialism, but I think it's rewarding for people who have struggled with that discontinuity to know that there's a link," she says. "It's not the biggest link ever, but it's there."

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