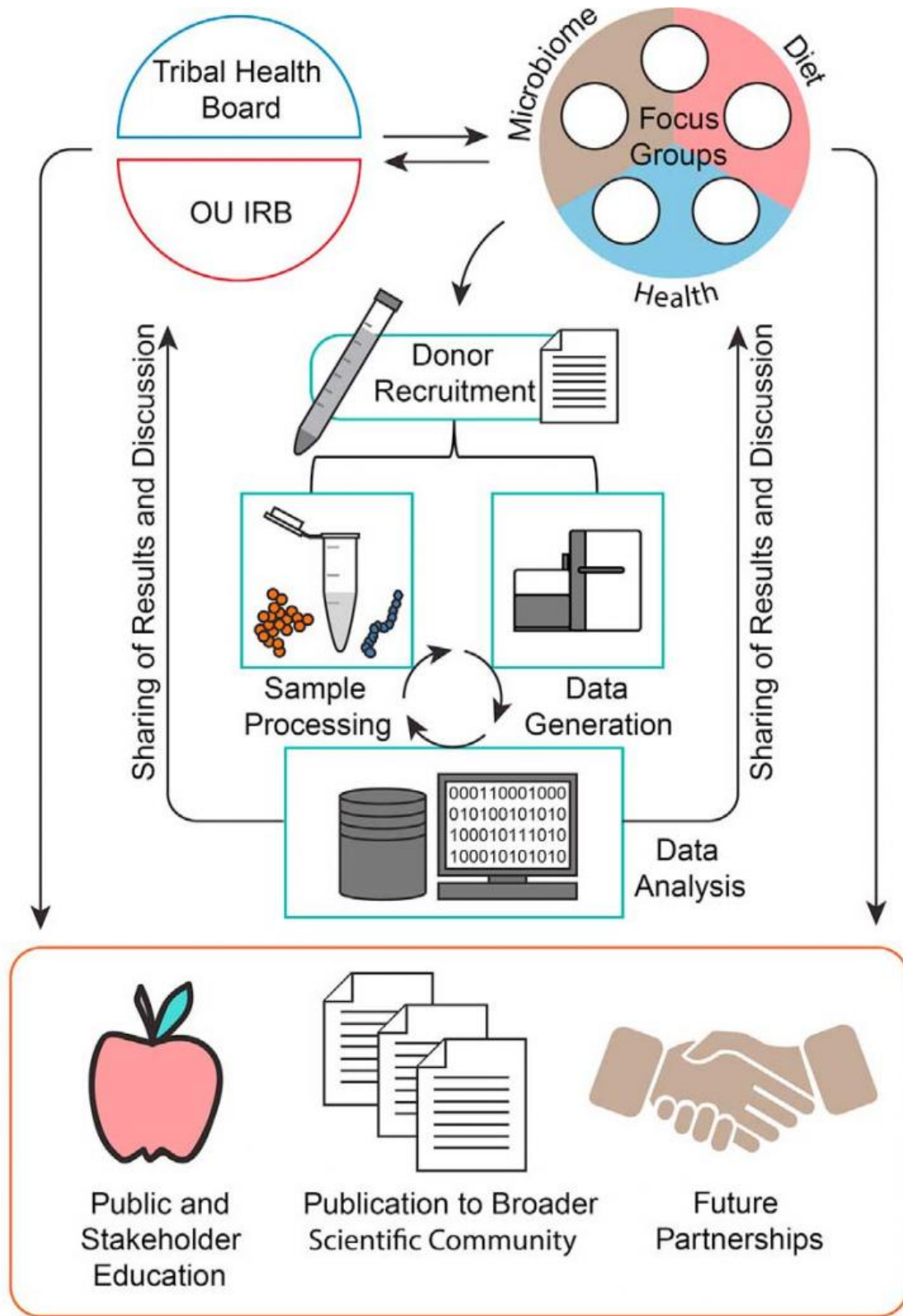


First look at gut microbes in an American Indian community

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This visual abstract describes an embedded ELSI approach to engage American

Indian communities in microbiome research. They also identify taxonomic and metabolic features indicative of gut microbiome dysbiosis among participants from the Cheyenne and Arapaho tribes of Oklahoma. Credit: Sankaranarayanan et al./*Current Biology* 2015

There's growing recognition that the trillions of microbes living in and on the human body—collectively known as the microbiome—play a critical role in health and disease. However, very little is known about how the diversity of those microbes might vary among different groups of people, and whether and how those variations might play into well-recognized health disparities. Now, researchers reporting in the journal *Current Biology* on December 3 have taken a step toward filling those gaps with the first descriptions of the gut microbiomes of individuals in a Native American community.

"Euro-Americans from metropolitan areas provide most of the information about the [human microbiome](#) that we have today," says Cecil Lewis of the University of Oklahoma. "If the future efficacy of human microbiome medical treatments is connected to ethnic background and lifestyle variables, then human microbiome information, as it is currently available today, is terribly biased. Our study essentially confirmed that, indeed, a metropolitan sample of predominately Euro-Americans may not well represent human microbiome diversity, not even within the US, not even within the one state in the US."

To Lewis and his colleagues, it was obvious that studies of the microbiome representing American Indians were sorely needed. American Indian groups in Oklahoma and elsewhere are known to have a high prevalence of obesity, diabetes, and autoimmune disorders—the very same disorders that have been linked in recent years to variation in the human microbiome.

"Given that many gut microbiome-associated complex diseases are also well-known [health disparities](#) among American Indians, it is surprising that no gut microbiome study to date has focused on these vulnerable groups," the researchers write. "To illustrate this point, we know more about the gut microbiome variation within ancient/archaeological American Indians than we do of extant American Indians who may potentially benefit from microbiome science."

Before beginning the study, the researchers spent three years partnering with the Cheyenne and Arapaho to discuss the issues and identify common ground. As Lewis explains, "These processes created mutual trust and understanding between our team and the participants that allowed us to conduct the more detailed study presented here, which has been an important impetus to additional health research and promotion in the tribes."

Lewis and his colleagues collected stool samples from 38 adults, along with information about their age, sex, weight, and health status. Study participants, including members of the Cheyenne and Arapaho tribe and non-native people included for comparison, also completed a three-day food journal. The researchers characterized the microbial community using DNA sequencing and also evaluated the samples for 500 metabolites.

The findings showed that the American Indian participants shared microbiome features common to industrialized populations. However, the Cheyenne and Arapaho showed a reduced abundance of a bacterial genus, *Faecalibacterium*, a group known for its anti-inflammatory effects. The American Indians also showed a fecal metabolite profile similar to one described in people with metabolic disorders.

"This [metabolite] profile had similar features to those observed in clinical cases of inflammatory bowel disease," Lewis says. "At first, this

may seem unsurprising because obesity and inflammatory disorders are known to be among the major health disparities observed within some American Indians groups. Yet, our study was not designed to target people with inflammatory disorders. Seeing this metabolite pattern in a non-clinically oriented research design was eye opening."

Lewis says that those differences will probably "come down to social practices and the built environment, rather than specific connections to a person's genetic ancestry." In other words, he thinks that the differences are more likely to be explained by environment and lifestyle factors than by ancestry and genetics.

With this baseline evidence in hand, they now hope to continue exploring the relationships between the microbiome and American Indian health.

More information: *Current Biology*, Sankaranarayanan et al.: "Gut Microbiome Diversity among Cheyenne and Arapaho Individuals from Western Oklahoma" [dx.doi.org/10.1016/j.cub.2015.10.060](https://doi.org/10.1016/j.cub.2015.10.060)

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