**Integrating African-American History into Biology: Mitosis, Epigenetics and 1619 “Foodways”**

In recent years, it has become apparent that the environment and underlying mechanisms affect gene expression and the genome outside of the central dogma of biology. It has been found that many epigenetic mechanisms are involved in the regulation and expression of genes such as DNA methylation and chromatin remodeling. Epigenetics is defined as the “the study of changes in organisms caused by modification of gene expression rather than alteration of the genetic code itself.” These epigenetic mechanisms are believed to be a contributing factor for pathological diseases such as Diabetes, type II. An understanding of the epigenome of diabetes patients may help to elucidate otherwise hidden causes of this disease, which disproportionately effects African American people.

Critical to the understanding of more complex mechanisms of inheritance we must first have a fundamental understanding of mitosis (i.e., cell division). Since 1996, as a new assistant professor of biology, I started to integrate the African Diaspora into teaching the cell cycle. I created a lecture that I call the “Mitotic Conspiracy.” I use the events of history interwoven with current events to give students a historic sense of place and an Afrocentric viewpoint of a biological phenomenon. I call it a conspiracy because by definition, a conspiracy is a belief that an unpleasant event or situation is the result of a secret plan made by powerful people. This opens a whole another level of discussion because it gets into the idea of self-actualization and persistence. In a recent publication that I helped to co-authored entitled, *Improving Underrepresented Minority Student Persistence in STEM*, we found that persistence is a very important indicator of long-term success as a STEM major. I use this as an opportunity to invite students to open up about those things that they may think limit them to be successful as scientist. Often times, they can see the humor in thinking that “secret plans” are laid to keep one from being successful.

I use the mitotic conspiracy as a way of embracing the cell cycle and to decipher the numerous steps to allow students to better grasp the concepts. Students are eager to follow because they have a shared interest in learning about facts that they may never read in their biology book. For example, one of my favorite topics in the mitotic conspiracy is what happens in interphase where all the genes are indistinguishable. The DNA exists as chromatin and not individual chromosomes. I make the analogy that interphase is like being in a village where living is more communal. I specifically have the students compare and contrast modern day family structure to those of traditional West African heritage. I tell them in kinship clans you cannot tell where one family begins or where the other ends. I specifically draw a connection to kinship clans and have them contrast that with the concept of the “nuclear family.”

To reinforce this idea, I highlight the work of the late Dr. Ivan van Sertima in the book, *They Came Before Columbus*. I use this book as a starting point early in the semester and as an introduction to the class and the textbook (which is usually a botany course) to set the stage for critical analysis for how species of plants get spread and how we can think about foodways and the acquisition, domestication and identification of plant materials. Van Sertima shows that several agro-economically important crops have an African origin. Those supporting the concept of geographic immigration of both people and plants. *They Came Before Columbus* helps to set the foundation to this idea of how people lived and how foodways become an important part of the African American narrative and eventually our historic eating patterns. I talk about the work of Michael Twitty, a culinary historian who specializes in African American Foodways, and his research on the fact that Virginia peanut soup has a Senegalese lineage.[[1]](#endnote-1)

In 2014 at the 1619 conference “*Settling of Jamestown”* held at Norfolk State University[[2]](#endnote-2), several scholars noted that the Jamestown settlers, the enslaved African and first Nations people of the 1600s had common food vocabulary. These findings has also been supported by the work of Nancy Carter Crump author of "Hearthside Cooking”. In her book she makes the claim that slave diets may have been healthier than their white counterparts. Her research suggests that "meat and starches were heavier on plantation dinner tables, but slaves were eating more vegetables." It is hard to know for a fact their exact diets, but we do know that genes associated with type 2 diabetes undergo epigenetic changes (i.e., histone and DNA methylation) and can be measured and correlated to diets which are high in sugar and starches.

I find presenting the facts in this way helps students to draw a connection to the information and it becomes more personalized. It allows them to think critically about how the cell cycle is regulated and/or influenced by our genetics and personal food choices. It teaches the value of thinking critically about the information.

**Work cited:**

Collins, G. (May 9, 2007) “*Where Settlers, Slaves and Natives Converged, a Way of Eating Was Born*” Washington Post. <Accessed May 11, 2017> (<http://www.washingtonpost.com/wp-dyn/content/article/2007/05/08/AR2007050800381.html>)

Crump, Nancy Carter (2008). *Hearthside Cooking*.2nd ed. Revised edition. Chapel Hill: University of North Carolina Press.

Estrada, M., Burnett, M., Campbell, A. G., Campbell, P. B., Denetclaw, W. F., Gutiérrez, C. G  Carlos G. Gutiérrez, Sylvia Hurtado, Gilbert H. John, John Matsui, Richard McGee, Camellia Moses Okpodu,T. Joan Robinson, Michael F. Summers, Maggie Werner-Washburne and M. Zavala. (2016). Improving Underrepresented Minority Student Persistence in STEM. CBE Life Sciences Education, 15(3), es5. <http://doi.org/10.1187/cbe.16-01-0038>

Van Sertima, Ivan. 1976. *They came before Columbus*. New York: Random House.

1. https://afroculinaria.com/ [↑](#endnote-ref-1)
2. https://1619makingofamerica.com/2013-conference/schedule/ [↑](#endnote-ref-2)