Togiak Archaeological Site Hair Samples- What Species?

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Togiak Archaeological Site Hair Samples- What Species?

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Introduction

- The Togiak Archaeological site is on the SW coast of Bristol Bay, Alaska
- The site contains the remains of an old Yu’pik village, across the bay from a current Yup’ik village: New Togiak Village
- Dr. Kristen Barnett and the Togiak Archaeological and Paleoenvironmental Project (TAPP) studied the site using surface/subsurface mapping, surface mapping using GIS, sub surface mapping using a geomagnetometer, and 36 core samples - no excavating out of respect for the current Yu’pik
- The core samples radiocarbon dated core samples to a minimum of 141 years ago and a maximum of 1242 years ago.
  - Included charcoal, shell, bone, and HAIR

- Mitochondrial (mtDNA) analysis of the hair samples could reveal what or whom the hairs belong by sequencing the 16S region
- If the mtDNA analysis turned out to be human, we were to stop analysis and confer with the New Togiak Village elders: the current residents of the closest village to the site and the descendants of those who lived there
- Nonhuman samples were to be analyzed further with additional molecular markers- we hypothesized that the hairs could be a) from the people who lived there b) from animals they used and/or ate c) from animals they lived with or d) from animals they used and/or ate

My Lab Methods

- Hair samples received by Molecular Anthro Lab
- Attempt to extract any mtDNA from the hair samples using an Invitrogen brand chargeswitch forensic DNA purification kit
- Checked to see if the mtDNA was amplified by running it through electrophoresis and photographed under a UV light to check for appropriate bands
- Amplified any mtDNA extracted using PCR. Used 16S primers to amplify the 16S region of the mtDNA in the hairs

My Results

- Every time we check to see if the extraction and PCR worked using electrophoresis the only hands we were able to see were from the control samples we added.

Togiak Archaeological Site Core Sample Map

The location of these core samples isn’t random- Dr. Barnett’s team, after much analysis, chose sites for samples that were most likely to be roasting pits inside the remains of houses.

Science is hard..and Ancient DNA is harder!

Lab Conclusions

- After Dr. Barnett’s team picked through their core samples and removed a number of hairs, which were sent to the Molecular Anthro lab: we tried to extract and amplify the mtDNA. If it had worked we would have analyzed it.

- Because we were able to get bands from our control groups we know it wasn’t a problem with PCR and that we just weren’t able to get any mtDNA out of Dr. Barnett’s samples.

- We suspect that this is because of problems with our extraction methods, especially since the hairs didn’t dissolve into solution. It’s likely the mtDNA with the answers to our questions is still trapped in the hair so we will try again soon.

- I considered the whole process to be lab learning experience; each failure is a chance to practice again!

Future Research Plans and Implications

- The most important part of this project is involving the community: the Togiak site (before Dr. Barnett’s time) has a history of exploitation and exclusion from archaeologists. They hope to use all findings to create a rich ethnohistory for the people and land

- Dr. Barnett has and will have community meetings with local Togiak community: Traditional Council, Elders Council, and Tri-Village Council as well as the greater Bristol Bay community at large including Bristol Bay Native Corporation (BBNC) and Bristol Bay Native Association (BBNA) to present and discuss her findings concerning their ancestors

- Once we get mtDNA analysis working on the hair samples the information in the DNA could be used for data on dog domestication, ancient caribou migration, or maybe used to defend subsistence rights for indigenous populations

- Developing the skills needed for working with ancient DNA is just as important to me as helping this project- very important! Figuring out a way to extract the mtDNA will be great practice

Acknowledgments

Dr. Meradeth Snow, Dr. Kristen Barnett, the Togiak Archaeological and Paleoenvironmental Project (TAPP) - Kristen D. Barnett, Anna M. Prentiss, Sarah Nowell, Dougless Skinner