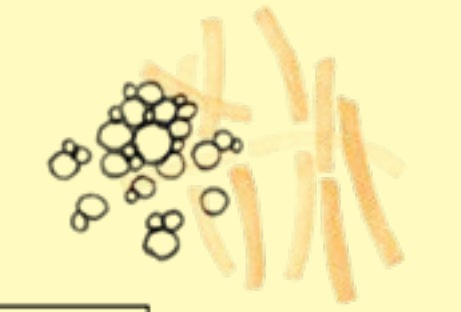


Allergies Begone!: DNA Barcode of Honey in NYC

Ariel Kuhl¹, Jessy Mei², and Rafael Fenutria³

Columbia Secondary School¹; Stuyvesant High School²; Icahn School of Medicine at Mount Sinai³



Abstract

People in New York City (NYC) suffer from seasonal allergies, the most common culprit being pollen. Nowadays, immunotherapy uses extracts of natural pollen to alleviate symptoms. The use of local **honey** as a substitute for this therapy is still being debated. Scientists have reported that the use of honey as a therapy may not be effective. Our project attempts to determine if local honey from NYC has the **pollen** which correlates with New Yorkers' pollen allergies. To do this, a method to barcode the DNA in honey from four boroughs was developed.

Introduction

Scientists are still debating the idea that if people with pollen allergies consume local honey, they could build tolerance to local pollen antigens. However, papers arguing against this theory failed to test the contents of the pollen their subjects consumed. If their "local" honey was not really local, it would have been ineffective in helping people to develop tolerance to the location specific pollen antigens. Our aim was to test and analyze the pollen contents of honey from NYC. Does local honey build tolerance to pollen allergies? We hypothesized that if local honey contains the pollen that people are allergic to, then it will boost people's tolerance to pollen.

Materials & Methods

First, honey samples were collected from local markets around NYC in order to have a large variety of pollen contents. A total of six samples during the Winter and Spring were collected. The different honey samples came from the Bronx, Brooklyn, Queens, and Manhattan.

In the lab, we followed the instructions of the DNeasy Plant Mini Kit extraction method, manufactured by Qiagen.



Fig 1. New York City map of five boroughs. The red dots signify the collections sites of our honey samples.

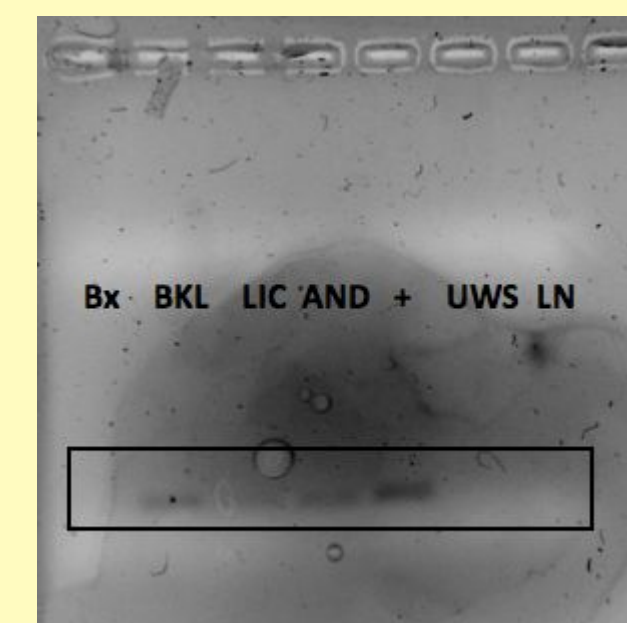


Fig 2. Agarose gel electrophoresis of PCR products of *rbcL* gen amplified from honey samples produced at Bronx (BX), Little Neck (LN), Long Island City (LIC), Midtown (AND), Upper West Side (UWS), Plant *rbcL* positive control (POS), and Brooklyn (BKL).

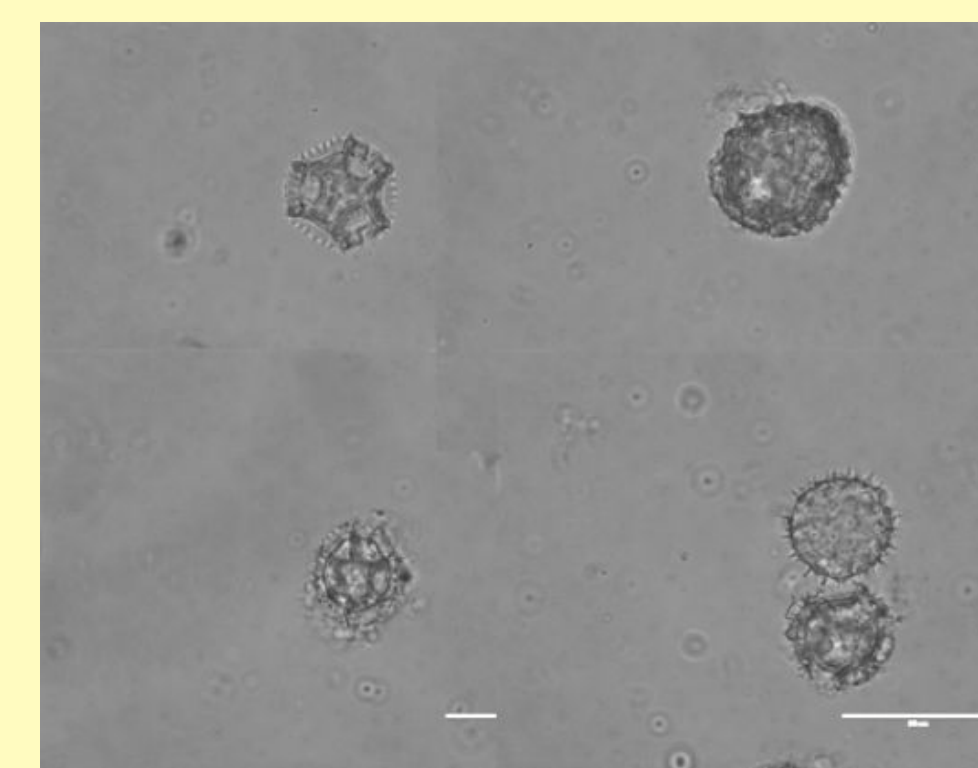


Fig 3. Microscopic images of isolated pollen grains from honey samples.

Table 1. Common Plants That Cause Allergies in NYC

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Trees	Bear Oak (<i>Quercus ilicifolia</i>)
	Black Ash (<i>Fraxinus nigra</i>)
	Black Willow (<i>Salix nigra</i>)
	Box Elder, Ash-Leaf Maple (<i>Acer negundo</i>)
	Green Ash (<i>Fraxinus pennsylvanica</i>)
	Mockernut Hickory (<i>Carya alba</i>)
	Northern White Oak (<i>Quercus alba</i>)
	Paper-Mulberry (<i>Broussonetia papyrifera</i>)
	Pin Oak (<i>Quercus palustris</i>)
	Post Oak (<i>Quercus stellata</i>)
	Red Mulberry (<i>Morus rubra</i>)
	Scarlet Oak (<i>Quercus coccinea</i>)
	Weeds
Halberd-Leaf Orache (<i>Atriplex patula</i>)	
Jesuit's-Bark (<i>Iva frutescens</i>)	
White Sagebrush (<i>Artemisia ludoviciana</i>)	
Grasses	Common Timothy (<i>Phleum pratense</i>)
	Large Sweet Vernal Grass (<i>Anthoxanthum odoratum</i>)
	Perennial Rye Grass (<i>Lolium perenne</i>)
	Soft Brome (<i>Bromus hordeaceus</i>)

Results & Discussion

Using two different pre-treatments of our eight honey samples, both led to poor DNA contents that were unable to be sequenced. Increasing the strength of our extraction buffers, or using a different primer could potentially improve the yield of DNA in our samples.

References

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Acknowledgements

We would like to thank the Urban Barcode Research Program, Dr. Christine Marizzi, and her team for giving us the opportunity to conduct research for this project. In addition, the Icahn School of Medicine at Mount Sinai was extremely helpful by providing laboratory equipment. Finally, we would like to thank the stores that were willing to participate in our study, especially Andrew's Honey.