



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

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| Name(s) Alejandra Mendiola | Project Number S0415 |
| Project Title Evaluation of Background Mitochondrial DNA Levels in the Household | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals It is not known whether mtDNA background levels are so high as to create complex mixtures with the criminal's mtDNA and prevent his/her identification. The purpose of this study was to evaluate the levels of background mtDNA on common household objects.</p> <p>Methods/Materials For my project I examined ten objects from the household and swabbed them at different time periods such as before cleaning, 1 day, 1 week, and then after 2 weeks without cleaning. Ten surfaces were the bedroom light switch, bathroom left faucet, bathroom right faucet, bedroom drawer, Inside Door Knob of Bedroom, Bedroom Window, Telephone in Living Room, Bedroom Outside Door Knob, Bedroom Closet Knob, Computer Keyboard in Bedroom, Negative control (tweezers), including the paternal and maternal mouth swabs. After collecting the samples the mtDNA was isolated by removing all of the cotton swab and subjecting it to a Chelex extraction. After extraction we used the thermal cycler to amplify the mtDNA. The amplified product was then analyzed by agarose gel electrophoresis stained with ethidium bromide so that we can compare it to the DNA Quantladder; 100-1000base pairs. The last step is to hybridize the product thus determining an individuals mtDNA type.</p> <p>Results In this study : 40% of pre-cleaning samples contained mtDNA; 50% of the 1 day samples contained mtDNA; 60% for the 1 week samples contained mtDNA; and the 2 week samples were inconclusive as to containing mtDNA (Chelex may have poor). Also, 50% of all of the samples collected contained mtDNA. Sample 7b (one day telephone) contained mtDNA, but gave no typing results. Otherwise, all mtDNA containing samples (16 total) produced typing results. 13 of the 16 typed samples were mixtures. Of the mixtures, 11 were consistent with a mixture of the paternal and maternal references.</p> <p>Conclusions/Discussion The Hypotheses of my study are: 1) The amount of mtDNA on an object will be directly propoortioinal to the amount of handling of the object. 2) Without cleaning the surface for a longer amount of time the more mtDNA will be collected. 3) Objects that are used by everyone will have mixtures of mtDNA.</p> | |
| Summary Statement Evaluating the levels of background Mitochondrial DNA on common household objects. | |
| Help Received Used lab equipment at CSULA under the supervision of Dr.Roberts and Professor Johnson | |