

A SMOKING GUN?

Alternative ways to obtain DNA profiles from cartridge cases.

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A common and increasing evidence type found at crime scenes is a **fired cartridge case**

The Current Problem

The DNA found on cartridge cases is generally too small and fragmented to be analysed using conventional, forensic DNA techniques¹.

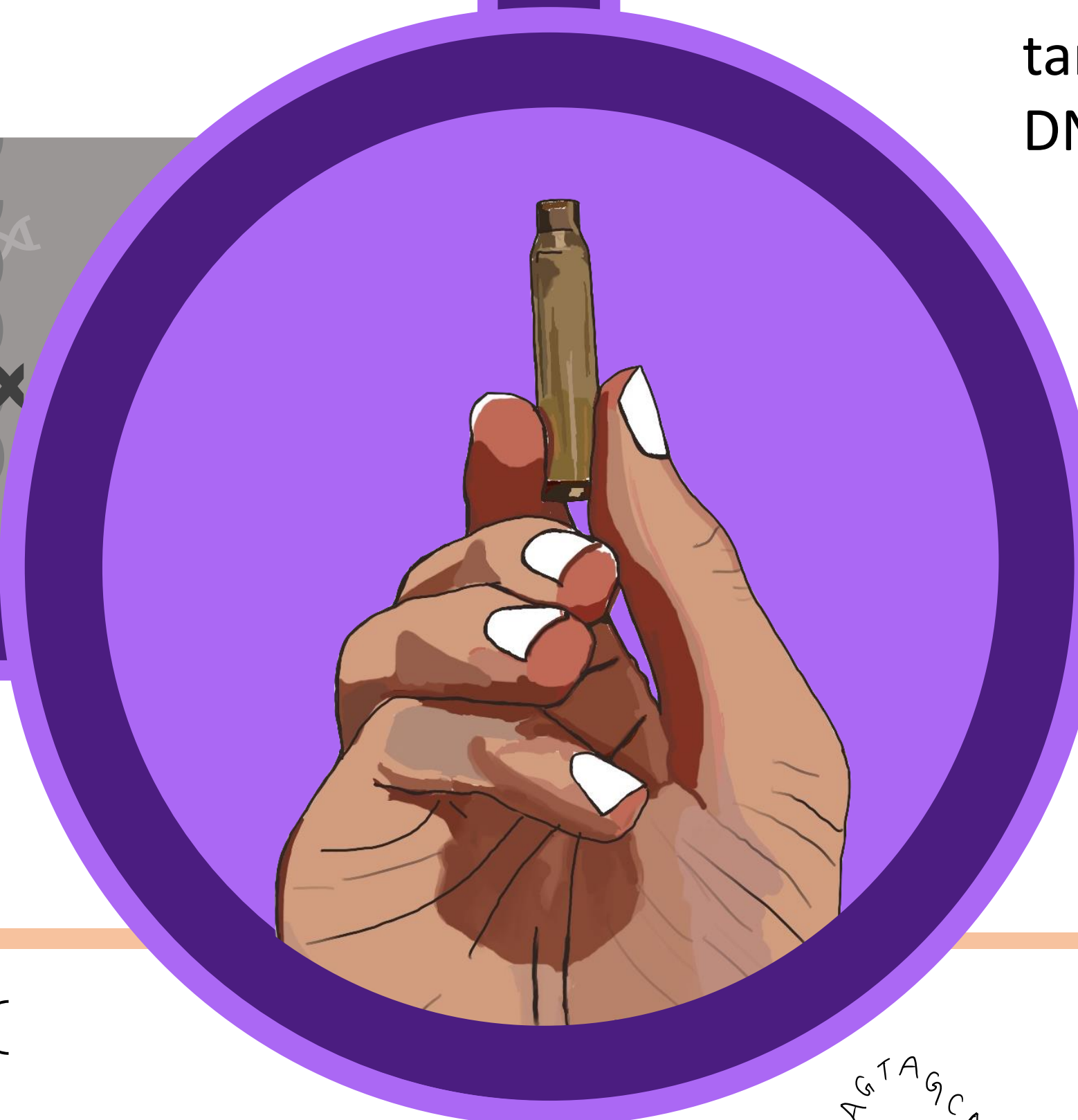


The Solution

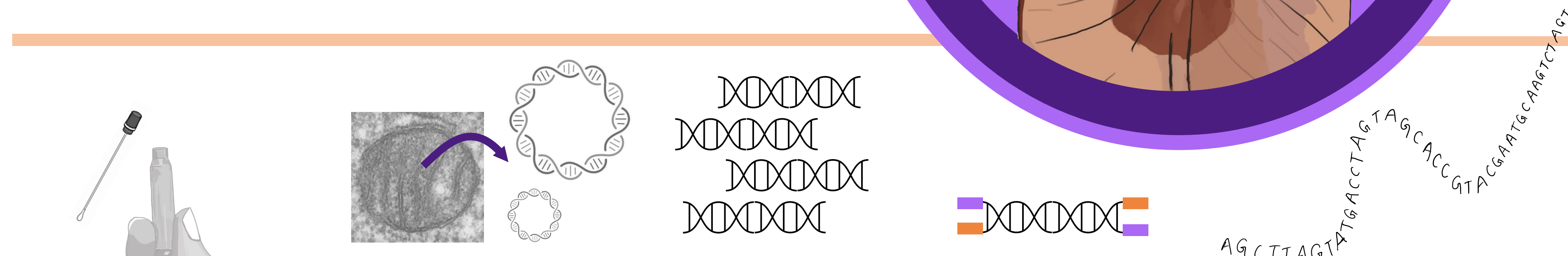
We are testing out **two** massively parallel sequencing technologies to evaluate if DNA profiles can be obtained from cartridge cases.

These technologies are:

1. The **Precision ID mtDNA Whole Genome Panel** which targets the entire mitochondrial genome. Mitochondrial DNA is present in multiple copies per cell.
2. The **ForenSeq DNA Signature Prep Kit** which targets single nucleotide polymorphisms (SNPs). SNPs are the shortest type of genetic variation.



What We Are Doing



Participants provide reference swabs and touched cartridges	Extraction of all genomic DNA from samples	Many copies of mitochondrial DNA or SNPs are made	Preparation of samples for sequencing	Mitochondrial DNA and SNP profiles obtained ^{2,3}
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Next Steps

We will start the analysis of the touched cartridge samples and compare results to the corresponding reference profiles.

This will determine if these new technologies are successful in generating DNA profiles from cartridge cases.

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References:

- ¹ Horsman-Hall KM, Orihuela Y, Karczynski SL, Davis AL, Ban JD, Greenspoon SA. Development of STR profiles from firearms and fired cartridge cases. *Forensic Sci Int Genet.* 2009 Sep;3(4):242–50.
- ² Forsythe B, Melia L, Harbison S. Methods for the analysis of mitochondrial DNA. *WIREs Forensic Science* [Internet]. 2021 Jan 1;3(1):e1388. Available from: <https://doi.org/10.1002/wfs2.1388>
- ³ England R, Harbison S. A review of the method and validation of the MiSeq FGx™ Forensic Genomics Solution. *Wiley Interdisciplinary Reviews: Forensic Science.* 2020;2(1):e1351.