

# Solving sexual assault cases using DNA mixture evidence

**National Sexual Assault Kit Initiative (SAKI)**  
**Bureau of Justice Assistance**  
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**Cybergenetics**

# Mixed results



eye of newt



toe of frog



**Double, double  
toil and trouble**

# Current incentives

- Process rape kits
- Produce DNA data
- Solve easy mixtures
- Many “inconclusive”

**Funding for work done**

# DNA success



eye of newt



toe of frog



Separate mixtures  
Get match strength

# Incentives for success

- Get information
- Search database
- Find criminals
- Free innocent
- Win justice
- Prevent crime

**Funding for information found**

# DNA investigation

## California serial rape

8 mixture items vs. 5 victims + 1 suspect

Description	Item	C0428X	C0459X	C0460X	C0475X	C0820X	C1147X
Purse strap	C0431X	18.73	5.91				1.63
Phone cord	C0432X						4.53
Phone	C0984X	18.74	2.06				4.62
Stain on pants	C0801S				16.39		6.24
Stain from pants	C0802S				17.42		6.73
Back of shirt	C0806S			6.69	17.43		8.86
Bathtub handle	C0929X					5.80	2.74
Zip tie	C0937X					4.55	20.32

**BRJ**

DNA match statistics  
corroborate victim statements

# New York daughter rape

Item	Description	4.1 Daughter	5.1 Father
2.2	Stain 9	<b>4.02</b>	<b>17.73</b>
	Stain 21	<b>16.87</b>	<b>14.22</b>
	Stain 26	<b>16.89</b>	<b>14.48</b>
	Stain 30	<b>9.32</b>	<b>17.74</b>
	Stain 31	<b>16.83</b>	<b>16.52</b>

# Louisiana pistol rape

Item	Description	1B Victim	2 Defendant A	11 Defendant B
9T2	inside of pistol barrel	<b>6.07</b>	<b>3.20</b>	<b>13.80</b>



# Indiana college rape

		001A1a	002A	005A1	006A1	014A	013A2
Item	Description	Defendant A	Defendant B	Victim 1	Victim 2	Defendant C	Unknown person
004A2	Condom, non-sperm fraction	<b>3.14</b>		<b>18.35</b>			
012A1	Handgun grip (TWG94487)		<b>7.59</b>		<b>13.72</b>		
012A2	Trigger/trigger guard (TWG94487)		<b>6.36</b>		<b>18.66</b>		
013A1	Handgun grip (TFW00049)	<b>1.21</b>	<b>7.30</b>	<b>6.44</b>			<b>7.67</b>
013A2	Trigger/trigger guard (TFW00049)	<b>1.71</b>	<b>2.25</b>				<b>=</b>

# Why DNA prosecution fails

**Rape kits are processed, but:**

**Data** isn't used

**Mixtures** aren't separated

**Genotypes** aren't found

**Matches** aren't reported

**Evidence** isn't produced

**Results** aren't explained

DNA exoneration

# Indiana rape exoneration



Database?

# Why DNA investigation fails

**Rape kits are processed, but:**

**Data isn't used**

**Mixtures aren't separated**

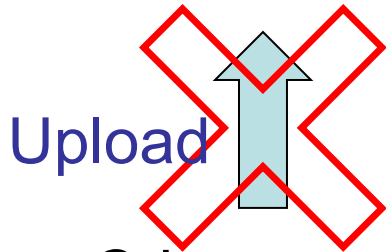
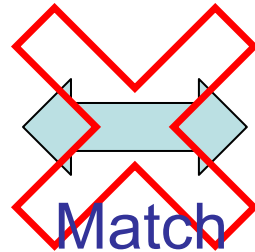
**Genotypes aren't uploaded**

**Database isn't searched**

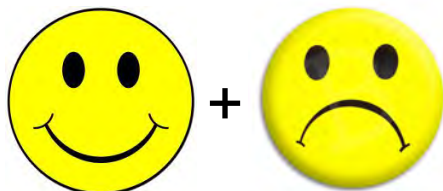
# DNA database we have

## Evidence

Allele database



Crime scene



Unseparated mixtures

## Reference

Allele database



Possible suspect



# DNA database we need

## Evidence

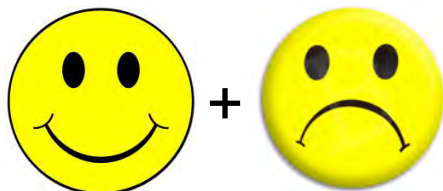
Genotype database



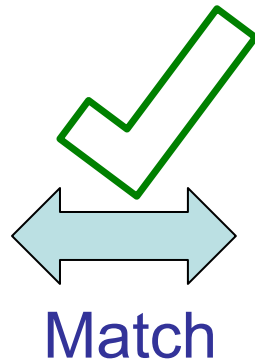
Upload



Crime scene



Separated genotypes



## Reference

Genotype database



Upload



Possible suspect



# More information

<http://www.cybgen.com/information>



- Courses
- Newsletters
- Newsroom
- Presentations
- Publications
- Webinars

<http://www.youtube.com/user/TrueAllele>  
TrueAllele YouTube channel



**Cybergenetics**



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