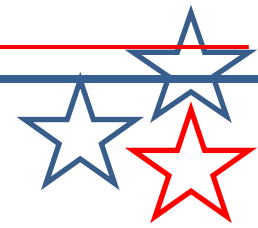

NIJ CONFERENCE, 2012



Boston University, Biomedical Forensic Sciences
DNA Mixture Analysis Training Tool

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DNA Mixture Analysis Training

Tool-Profiles

- Profiles
 - Single source
 - Two person
 - Three person
 - Four person
- Varying amounts
 - 0.625 to 4ng
- Ratio of contributors varies in both directions
- Amplification kits
 - PowerPlex 16
 - Identifiler
 - Yfiler
 - Minifiler
- Three injection times
- 930 samples amplified
- 2790 profiles


DNA Mixture Analysis Training Tool-Website

- Lessons on basic features of DNA profiles that impact mixture analysis
- Profiles in lessons can be viewed and compared and enlarged
- User can save their notes and answers
- All website profiles with corresponding ladders and controls can be downloaded as .fsa files for use in training or other purposes

DNA Mixture Analysis Training Tool-Website

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DNA Lessons

All Lessons 

[Lesson 02: Single Source Samples: Artifacts - Identifying & Troubleshooting](#)

[Lesson 12: Recognizing a Mixed DNA Sample](#)

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Profile Files

- [1-Person Profiles \(C\) and \(D\)](#)
- [1-Person Profiles \(A\) and \(B\)](#)
- [2-Person Profiles \(AB\)](#)
- [2-Person Profiles \(CD\)](#)
- [3-Person Profiles](#)






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Lesson 12

Recognizing a Mixed DNA Sample

Introduction	Single Source or Mixture? - The Beginning of Mixture Interpretation	Single Source or Mixture? - Confounding Factors				
Tri-alleles and tri-allelic loci	Elevated stutter peak	Artifacts	Contamination	Drop-in allele(s)	Primer binding site mutations	Drop-out
Preferential amplification	Degradation	Problem Set 1	Problem Set 2	Problem Set 3	Problem Set 4	Problem Set 5
Additional Questions	References					

Introduction

This lesson presents the various indicators for determining that a DNA profile contains a mixture of DNA from two or more individuals. Factors affecting the determination that a sample contains a mixture of DNA will be presented including information regarding tri-alleles and tri-allelic loci.

[Next section »](#)



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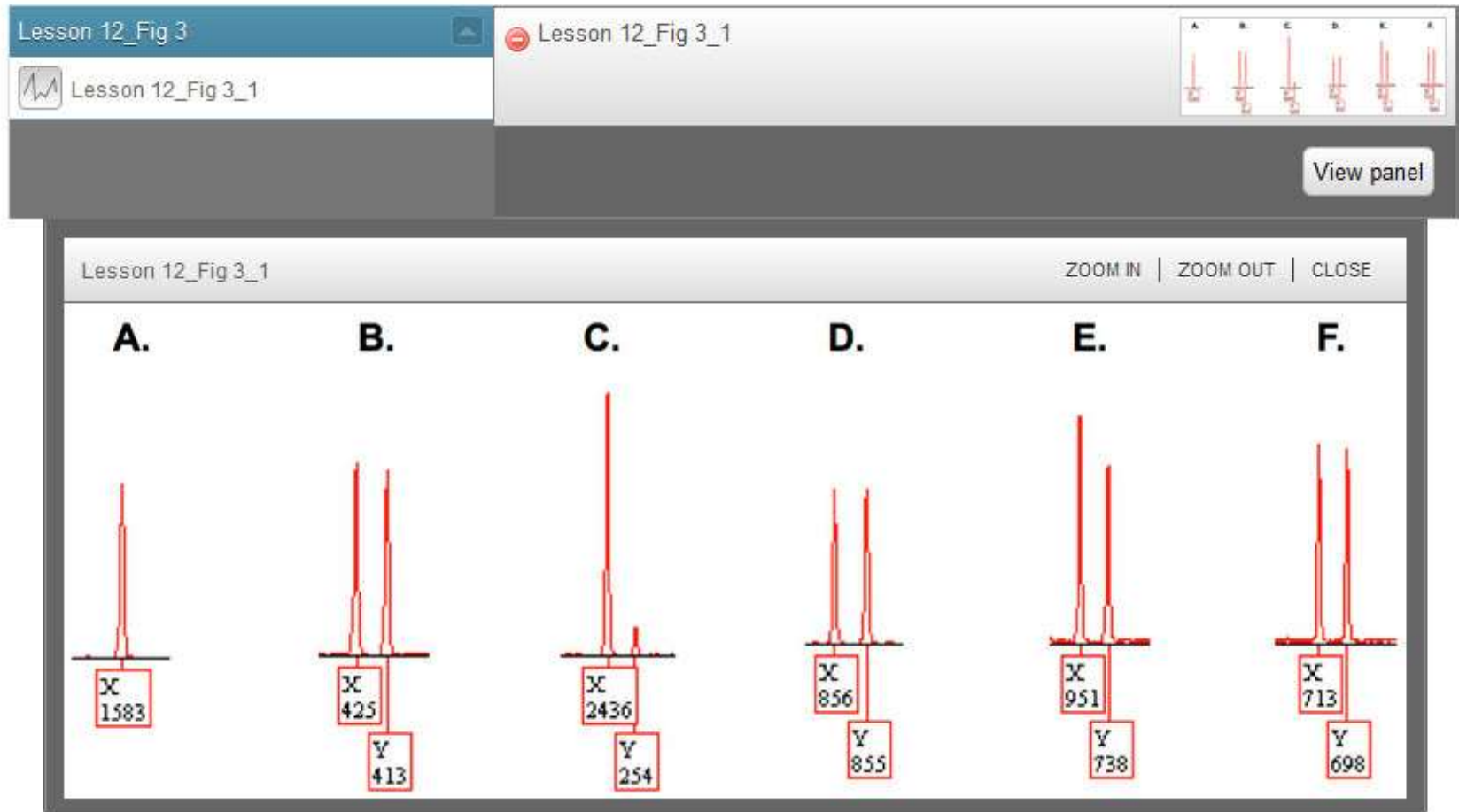


Figure 3. The amelogenin profile from: (A) a female DNA donor; (B) a male DNA donor; (C) DNA from a female donor and a male donor mixed in a ratio of 4:1 (female to male); (D) DNA from a female donor and a male donor mixed in a 1:19 ratio where the amount of DNA from the male donor far exceeds the amount of DNA from the female donor; (E) DNA from two male donors in a two person mixture (from the profile shown in Figure 1); and (F) DNA from three male donors.

DNA Mixture Analysis Training Tool-Website



Figure 1. The profile from a two person mixed DNA sample amplified with the Identifiler kit and injected for 2 seconds is shown. Multiple alleles present at many loci clearly indicate the presence of a mixture.

The profile shown in Figure 1 contains a mixture of DNA from two males mixed at a 4:1 ratio and amplified with the Identifiler kit. The presence of four alleles at the D8S1179 locus and three alleles at the D21S11, D7S820, and CSF1PO loci in the first row of the profile clearly indicates the presence of a mixture of DNA. Additional three allele loci (e.g., D3S1358, D13S317, D16S539, D2S1338, D19S433, vWA, D5S818, and FGA) and another four allele locus (D18S51) are consistent with this conclusion.

In addition to the multiple alleles, peak height imbalance is also present at all of the loci in the profile shown in Figure 1. As discussed in Lesson 1, heterozygous alleles in a single source profile are expected to be present in equal amounts and therefore have approximately the same peak heights (or peak areas); however, some variation due to the technical limitations of testing is routinely observed. As seen in Figure 2 below, the peak height imbalance at the TPOX locus, which has only two alleles with a ratio of 0.22 or 22% (i.e., 506 RFU/2333 RFU), indicates the presence of a mixture of DNA. The peak height ratio at the TH01 locus, which is the only other locus with just two alleles in this mixture, is 0.67 or 67% (i.e., 788/1178). Although the TH01 locus data alone may be insufficient to determine that a mixture is present, the data support the conclusion of a mixture determined using the other loci.

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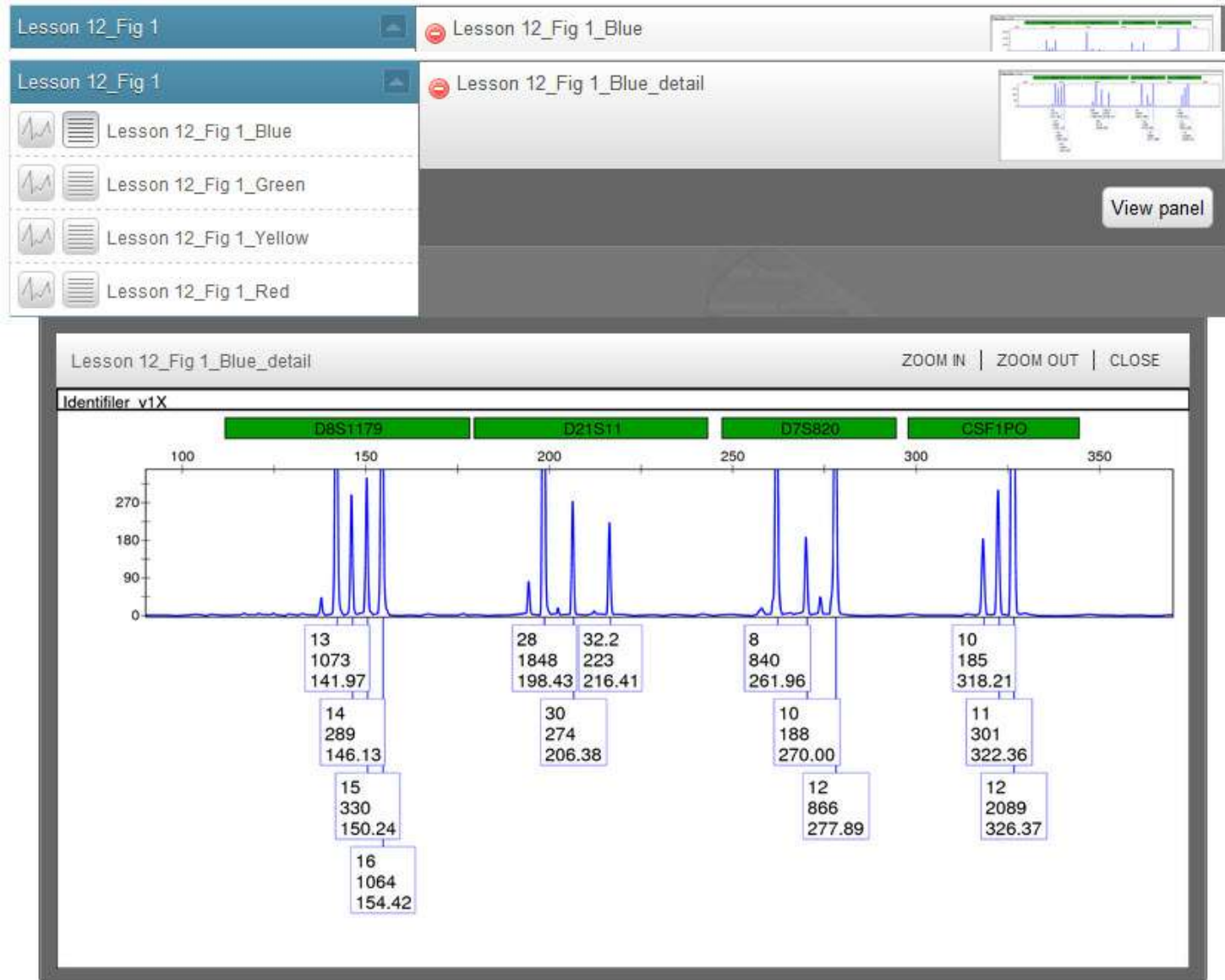


Figure 1. The profile from a two person mixed DNA sample amplified with the Identifiler kit and injected for 2 seconds is shown. Multiple alleles present at many loci clearly indicate the presence of a mixture.

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Problem Set 3

Question 1:

Based on the information presented, does this DNA profile contain a mixture of DNA?

Lesson 12_Ex 3_Q1

Lesson 12_Ex 3_Q1_Blue

Lesson 12_Ex 3_Q1_Green

Lesson 12_Ex 3_Q1_Yellow

Lesson 12_Ex 3_Q1_Red

Lesson 12_Ex 3_Q1_Blue



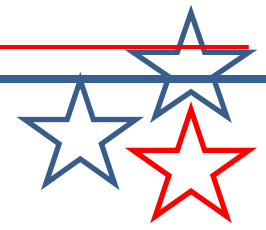
View panel

Student Responses

Notes

Write and save any notes or comments here.

Save Answers



Will announce launch this fall on
STRBase

Thank you *NIJ* and all the
contributors to the project