

CAN THE RAPIDLY MUTATING LOCI IN THE YFILER PLUS® AMPLIFICATION KIT DIFFERENTIATE THE MEMBERS OF A LARGE FAMILY?

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The Yfiler Plus® (YFP) amplification kit (ThermoFisher Scientific) amplifies 27 Y-STR loci, including seven highly polymorphic rapidly-mutating loci: DYF387S1a/b, DYS449, DYS518, DYS570, DYS576, and DYS627. The kit is advertised as having “powerful discrimination capacity, particularly between closely related males”, which could be of use in casework where multiple related males are named as suspects. In an effort to determine whether father-son pairs, siblings, paternal uncle-nephew pairs or paternal cousins can be differentiated in routine casework, standards from a large family set, including three generations of male relatives, were acquired and their Y-STR DNA profiles were determined using the Yfiler Plus kit.

Out of 19 typed male relatives, 3 mutation events were observed. Three brothers in the second generation demonstrate a difference from the family profile at the DYS627 locus, one of the rapidly mutating loci. One member of the next generation displays a reverse mutation back to the family profile. In addition, one member of the third generation displays a difference at the DYS456 locus, which is not considered a rapidly mutating locus.

If the results from this family set can be assumed to be typical, it will be rare to be able to differentiate family members with the YFP amplification kit. Infrequent mutations may be observed, allowing some father-son pairs, siblings, paternal uncle-nephew pairs or paternal cousins to be differentiated from one another, but most paternally related individuals will be expected to have the same YFP DNA profile.

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