Development of Twelve Tetranucleotide Short Tandem Repeat Loci Using Polynesian and Caucasian DNA Samples

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Since the advent of the polymerase chain reaction and arising genetic technologies the area of personal identification and population genetic affinities has expanded at a phenomenal rate, with the benefits of the aforementioned technology mirroring this rate of change.

In this present study, twelve novel short tandem repeat loci (D1S407, D2S262, D3S1514, D4S2285, D4S2289. D5S592, D7S618, D9S252, D10S520, D10S526, D12S297) have been developed for use with the polymerase chain reaction technique. These microsatellite loci were located by the Utah Marker development Group and have had little or no previous population work carried out. U.K. Caucasian, Polynesian and Tribal DNA samples from New Zealand of known admixture have been analyzed for microsatellite genetic variation.

Each locus has been optimized for the polymerase chain reaction using the Perkin Elmer 480 thermocycler. Typically the singleplex 50µl reaction mixture consists: deionized autoclaved nuclease free water, 0.2µm primer (Genosys), Buffer (Advanced Biotechnologies) 1.5 or 1.25mM MgCl2 (Advanced Biotechnologies), 200mM dNTPs (Advanced Biotechnologies), 1-10ng Sample DNA and 1.25 Units Taq (Thermus Icelandicus', Advanced Biotechnologies), with an oil overlay.

Analysis of the amplified products has been carried out using a new submarine gel electrophoresis system from Elchrom. This new system has reduced time and cost in comparison to the polyacrylamide gel electrophoresis and silver staining techniques previously used in our laboratory. Altering the thermocycle parameters and concentrations of various reaction components a triplex multiplex using the three clearest systems (D1S407, D7S1485, D4S2289) has been optimized, where the fragment sizes of the amplified loci do not overlap.

This work forms part of ongoing research with respect to novel short tandem repeat loci and diverse ethnic populations.