

# Determining human blood type by non-invasive methods

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**Abstract:** I was surprised to find that only ~30% of my genetics students knew their blood type. Given the concern about blood-borne pathogens, students rarely determine their blood type in high school or introductory college biology laboratories. We have developed protocols that utilize basic molecular biology techniques to determine human blood type without drawing blood, and we have successfully incorporated this exercise into our Introduction to Biotechnology Lab course. Students isolate genomic DNA from their own saliva using the Oragene kit (DNA Genotek Inc.). Polymerase chain reaction is used to amplify exons six and seven from the *ABO* gene. These PCR products are subjected to restriction enzyme digestion to identify single nucleotide polymorphisms (SNPs) that are associated with each *ABO* allele. Analysis of only four SNPs can differentiate among the five most common alleles: A<sup>1</sup>, A<sup>2</sup>, B, O<sup>1</sup>, and O<sup>2</sup>. An additional PCR reaction is required to determine whether students are Rh-positive or Rh-negative. I have found that this activity stimulates a good deal of excitement as students have an inherent interest in finding out about themselves.