TEACHING THE

GENOME GENERATION

DNA EXTRACTION PROTOCOL (QUICK)

The Jackson Laboratory

*Leading the search
for tomorrow's cures*

PREREQUISITES & GOALS

PREREQUISITES

Prior to implementing this lab, you should understand:

- The central dogma of how DNA bases code for mRNA and then for proteins

- The purpose of the DNA EXTRACTION PROTOCOL is to extract human DNA and make the sample ready to amplify in the PCR PROTOCOL

- Units of measurement (μL)

LEARNING GOALS

1. Complete lab procedures necessary to collect DNA samples.

2. Identify ethical issues with DNA sample collection

ETHICAL ISSUES

This protocol uses saliva and cheek cells therein as a source for extracting purified human DNA. This DNA collection stage is 100% voluntary. There are personal, cultural, religious, and privacy based reasons why students may not want to participate.

All experiments in these labs are demonstrations; none of the genotyping performed on the human samples are in any way diagnostic. Although you may want to know your own personal genotype or DNA sequence, samples should remain anonymous. It is imperative that the samples collected are not labeled by name, number or category of any kind. The goal is to keep samples anonymous and not be able to match sample to person. At the end of this protocol, unlabeled DNA tubes will be collected and a tube with a generic labels (1,2,3,etc. or A,B,C,etc.) should be returned to you prior to starting subsequent procedures.

MATERIALS

REQUIRED LAB MATERIALS

Refrigerator

Markers for labeling

Toothpicks

PROVIDED BY JAX

0.2 mL tubes with 50 µL of
X-tract buffer

Tube holders/racks

Thermal cycler

WORKSTATION NEEDS
*These materials should be at
each workstation*

0.2 mL tubes with X-tract buffer

Tube holders

Markers for labeling

PROCEDURE

☐ STEP 1

Obtain one 0.2 mL tube with 50 µL of X-tract buffer.

☐ STEP 2

Obtain a flat-headed toothpick and with one end, gently rub the inside of your cheek for 5 seconds.

☐ STEP 3

Dip the cheek-end into the buffer.

☐ STEP 4

Swirl the toothpick in the buffer for 5 seconds.

☐ STEP 5

Remove the toothpick from the solution and cap the tube tightly.

☐ STEP 6

The thermal cycler provided by JAX has been pre-programmed to run the extraction protocol.

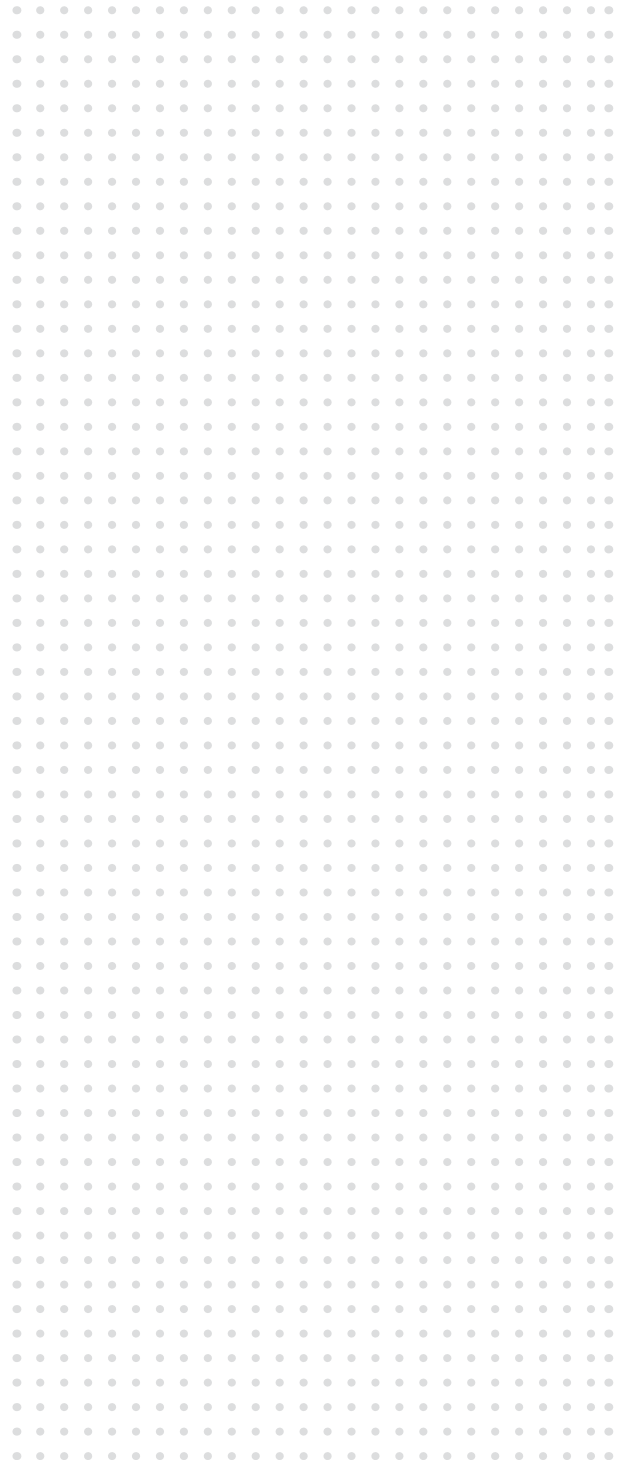**XTRACT**: Isolates DNA from saliva samples in X-tract buffer

PCR cycling conditions:

1. Cell lysis and
   protein degradation   95° C   20 min.

2. Final hold   4° C   forever

☐ STEP 7

Consult your teacher for proper use of the thermal cycler provided.
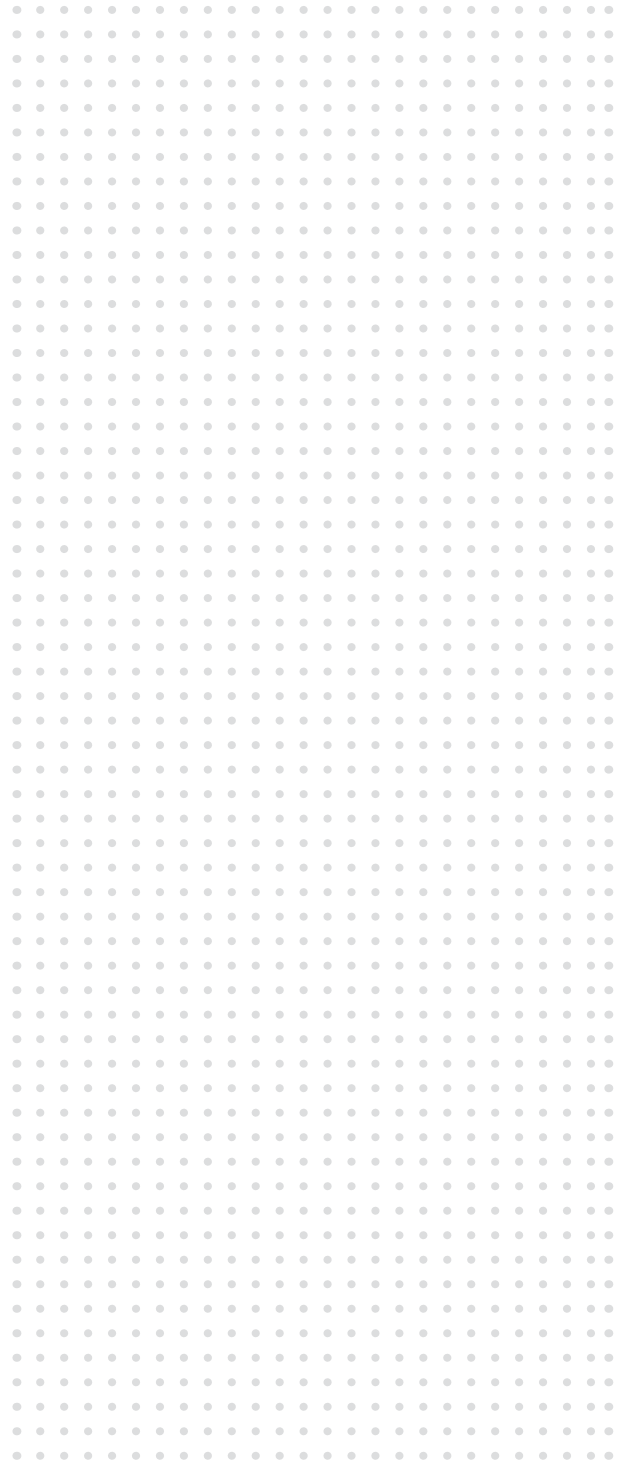
NOTES

☐ STEP 8

Remove the samples after the protocol is complete, stop the program and turn the machine off.

Expected result is to have
one tube per DNA sample with
50 µL of clear solution.

SAMPLES MUST BE USED IMMEDIATELY.

The samples are now ready for
POLYMERASE CHAIN REACTION
(PCR) PROTOCOL

NOTES