GeneChip® Microarrays

Activity #4 – Reading and Analyzing GeneChip microarrays: Results from Real Life Scenarios

Introduction:

In this activity, you will get the opportunity to use what you learned about GeneChip microarrays from Activity #2. Students will be organized into groups of five or six and each group will be assigned a different scenario that uses one of three different types of DNA chips, Gene Expression, Resequencing, or Genotyping, in the research. Each scenario will have its' own set of results that the group must analyze, interpret, and then present to the class what they determined in a short, five minute presentation. The presentation should include relevant experimental background, the experiment itself, the results, the analysis, and possible future research.

The purpose of this activity is to challenge you to analyze and interpret data in a group setting and work out a real life research problem. All scenarios and results are simplified, but are related to real research and medical studies occurring in recent studies.

Goals of Activity:

The goals of this activity are:

#1 – To apply knowledge of the function of DNA chips to the analyze results of DNA chips in simulated scenarios
#2 – To work as a group to analyze and interpret data
#3 – To work as a group to present the results and their implications to the class
#4 – To communicate within a small group and to an entire class

Procedure:

(1) Teacher will organize students into up to 6 groups

(2) Teacher will assign each group a different scenario with a background, results, and data to analyze

(3) Students will spend 20 minutes reading the background to the scenario, looking at the results, interpreting the results, and discussing the implications of the results to the research and to further studies

(4) Student groups will spend 20 minutes working on a class presentation, being sure to cover the following:
    (a) The background to the scenario or experiment that was conducted
    (b) The scenario data or experimental results
    (c) A breakdown and analysis of what the data / results mean
    (d) If possible, what future research should be done as a result of this work

(5) This presentation should be well organized, clear in its interpretation, and must include some sort of visuals (overheads / poster, handouts, etc.) to help the class understand the results

(6) Each group will get 5 to 7 minutes for their presentation (not every person is required to talk for each group, but more than one student needs to speak)

(7) Students will be graded on their work while in the groups and on the presentation using a rubric as a scoring guide.

(8) During the presentation, students not in the group presenting should fill out the summary sheet for each presentation (but their own)

The Scenarios:

A – Food Contamination Analysis using the Fish DNA GeneChip microarray

B – Drug Metabolism Analysis using the CYP GeneChip microarray

C – HIV Genotyping using a HIV GeneChip microarray

D – Gene Expression in *Vitis vinifera* (grape) using a Grape Genome Array

E – Breast Cancer progression research using Human Genome Array

F – E. coli form strain identification using Genome (Resequencing) Array