Gilles Carpentier: Protein Array Analyzer for ImageJ

Abstract

Scope : protein array is used to analyze protein expressions by screening simultaneously several protein-molecule interactions such as protein-protein and protein-DNA interactions. In most cases, the detection of interactions leads to an image containing numerous lines of spots that will be analyzed by comparing tables of intensity values. To describe the observed different patterns of expression users generally show histograms with the original associated images [1]. The “Protein Array Analyzer” [2] gives a friendly way to exploit this type of analysis, thus allowing quantification, image modeling and comparative analysis of patterns.

Materials and Methods: among the large number of available protein array techniques, the data exhibited here for demonstration come from mouse cytokine antibody arrays [4]. 62 distinct antibodies are arrayed, along a 14 x 10 grid displayed on 26 x 17 mm membranes. Biological samples have been obtained from plasma of mice treated with a drug susceptible to modulate cytokin levels. Chemiluminescence detection was imaged after x-ray film exposition, using a CCD camera device. The software was programmed in ImageJ’s macro language and was graphically interfaced which greatly simplifies analysis. This project is based on a previous work, the “Dot Blot Analyzer” [3] that already permits to analyze spot array through a graphical interface.

Features : once arrays are individually analyzed using the “Array Analysis” tool, the “Group Pattern” tool then allows to obtain a global view of a set of arrays. At this step, it is possible to set common internal references to get a normalized modeled master image, built from the normalized measurements resulting from array analysis. The tool contains the generally required online functionalities of software: documentation, demo images for training and update facilities.

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Keywords

protein array, cytokine antibody array, dot blot, macro language, graphical interface

Administrative data

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