The Analysis of DGGE Gels

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Denaturing Gradient Gel Electrophoresis (DGGE) is a method for the separation of nucleic acids like DNA or RNA, and the analysis of proteins. The samples are placed on the edge of the gel and drawn through it by an electric field. The DGGE gel has a gradient of denaturing compound that at higher concentrations causes the DNA to melt, changing its rate of progress through the gel. Small changes in the DNA (as little a a single base substitution) cause the DNA to melt at different concentrations of denaturant, allowing separation of very similar DNA fragments. The resulting distribution of the DNA fragments is read using radioactive isotopes, fluorescent dyes in the samples, or staining with silver. This gives the familiar banded image, with each sample forming a lane in the gel. Issues which must be addressed in any statistical analysis are the alignment of the lanes to give consistent band positions, as often the rate that the lanes progress varies across the gel, and the lanes can diverge from parallel tracks. The use dynamic warping (the Viterbi algorithm) can be used to align the lanes so that the peak positions occur together. This talk will illustrate this method along with an approaches to identify the peaks in the intensity along the lanes (a peak = a band on the image), and the subsequent analysis of the peak data.