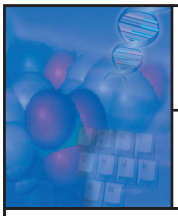

Intellectual Property & Bioinformatics

Jonathan Gressel, Chair

Protecting your Crystal, Crystallography Data and their Uses

Gal Ehrlich, Patent Attorney, e-mail: gal@ipatent.co.il

The structural data of proteins and their association with ligands obtained via X ray crystallography is highly valuable and useful for drug development. The talk will focus on patenting strategies directed at protecting the structural data and information emerging from X ray crystallography studies. Certain subject matter aspects pertaining to X ray crystallography patents, for which there is an open debate with respect to patentability will also be discussed.

A Proposed System for 'Biobarcoding'™ Organisms

Jonathan Gressel, Department of Plant Sciences, Weizmann Institute of Science

These are a variety of needs for devising simpler recognition methods for organisms marketed in commerce or released in the environment; whether they are conventionally selected, mutant, or transgenic bacteria, fungi, plants or animals. The needs include:

The need for protection for patented or other IP lines, where IP takes on either designation: "Intellectual Property" or "Identity Preserved". It is often hard to prove that a line has been 'miss-appropriated' by a competitor.

Labeling Regulatory authorities and various consumer groups are demanding labeling of transgenic commodities. They spend vast sums typically probing for commonly used promoters or selectable marker genes and not for the trait genes, in an effort to save. Even when transgenics are discovered by such 'kits', there is no information as to source. Thus, regulatory authorities may wish to consider simple, common recognition sequences for detecting transgenic or other organisms in the market place.

The need to trace organisms in the environment. The use of mycoherbicides and other live organisms as inoculants and or as biocontrol agents to control weed, bacterial, fungal, or insect pests is increasing. This need is irrespective of whether indigenous or transgenic. Many of the agents are closely related to known pathogens or pests and there are claims that an organism may change its host range and attack valuable species. There are complicated DNA fingerprinting techniques to accurately ascertain causality, but they cannot be used to probe what released organism might be present. There are also fears that organisms will mutate or introgress with other organisms, and there are needs to know whether the organism changed host range (with consequences of liability) or whether an epidemic was due to wild strains. These issues will become more acute with transgenically-enhanced organisms.

The simplest detection system for differentiating a large number of products is the "bar code" system. A simple genetic analogy encoded in DNA sequences – "biobarcodes" is proposed. A set of

two universal 'nonsense' (non-coding) nucleotide sequences is designed. These can be detected by a set of universal PCR primers that can be used to recognize all biobarcodes. The universal primers are long enough that a few mutational changes in the initial universal sequence will still allow it to be recognized by a PCR primer. The universal recognition codes are followed by a designed and assigned nonsense sequence that is long enough to allow tens of millions of different such sequences to be generated, and again allow for some mutational changes. Neither the initial universal recognition sequence nor the particular individual strain sequence should even vaguely resemble nonsense sequences reported in any gene data base. The algorithms used to generate the sequence are designed to exclude sequences that could self anneal, preventing the taq polymerase from amplifying the DNA. Frame shift mutations should not render any part of the biobarcode sequence as an open reading frame coding for a peptide – stop codons are interspersed so as to prevent frameshift mutations to form long open reading frames. The biobarcodes should be assigned by a single assigner, and the assigned codes are to be publicly available. The biobarcode DNA can be co-transformed with the gene of choice. In other cases, an excisable selectable marker will be needed, so that just the bar code remains after transformation.

The PCR amplified barcodes can be automatically sequenced and compared to the barcode database to ascertain the source of the organism. Should there be a possibility of introgression of the barcode from the initial organism into another strain or species, R or AFLP can be used to further verify the source