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25 years of Applied Biosystems' Model 470A Protein Sequencer

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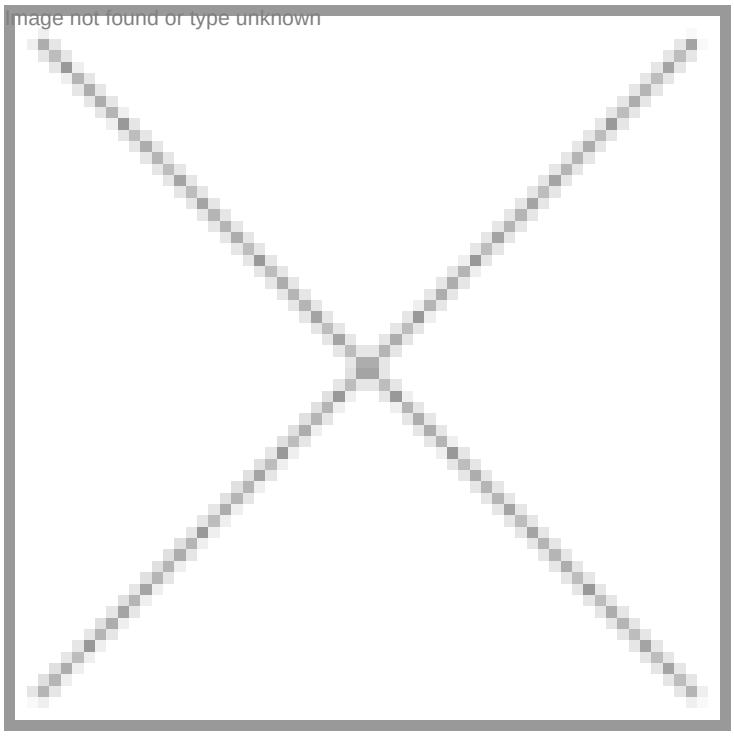

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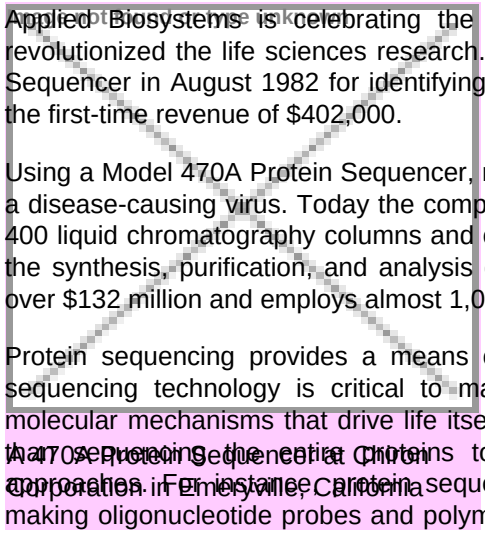

A 470A Protein Sequencer at Applied Biosystems Inc. in Foster City, California

Applied Biosystems is celebrating the 25th year of introducing its first product-the protein sequencing machine that revolutionized the life sciences research. Applied Biosystems released its first commercial product, the Model 470A Protein Sequencer in August 1982 for identifying the amino acid sequence within a purified protein for which the company reported the first-time revenue of $402,000.

Using a Model 470A Protein Sequencer, researchers can, for example, determine the sequence of one of the coat proteins of a disease-causing virus. Today the company manufactures and markets more than 25 different automated instruments, over 400 liquid chromatography columns and components, and approximately 320 chemicals, biochemicals, and consumables for the synthesis, purification, and analysis of DNA, proteins, and other biological molecules and the company posts sales of over $132 million and employs almost 1,000 workers in eight countries.

Protein sequencing provides a means of obtaining information about the primary structure of polypeptides and protein sequencing technology is critical to mapping the human genome and bringing humanity closer to understanding the molecular mechanisms that drive life itself. Protein sequencing has remained central to modern molecular research. Rather than sequencing the entire proteins today's requirements are generally more to supplement and compliment other approaches. For instance, protein sequence information is a prerequisite for DNA cloning, providing the information for making oligonucleotide probes and polymerase chain reaction chain primers. It allows the synthesis of peptides for antibody production, provides identification of proteins of interest and helps in the characterization of recombinant products. A major

use of protein sequencing is in the study of post-translational modification.

25 years later the general methodology has changed relatively little since the introduction of the first protein sequencer. However, the use of automated equipment to perform multiple cycles have greatly improved the efficacy of sequencing. Automated protein sequencing as a recent advance has been a major significance in the field of biotechnology. Optimization has allowed the determination of extended sequences of very low abundance proteins. Much effort in recent years has been devoted to improving the sensitivity of protein sequencers by using new, highly sensitive methods for identifying amino acids. A large number for upgraded, automated and sensitive DNA sequencing machines continue to enter the market at a much cheaper cost.

With the advances in protein sequencing technology the vast amount of protein sequence data now available, together with accumulating experimental knowledge of protein function, enables modeling of protein sequence and function evolution to model evolutionary sequenceâ€“function relationships on a large scale. It is important to mention that the results delivered so far are mostly descriptive and give the essential basis for further investigations which will need to be carried out in order to make the best use of this linear sequence of information.

Data from protein sequencing experiments have provided scientists with a wealth of information establishing the basis for the investigation of cellular processes. Towards the end of their research and development efforts, pharmaceutical companies seek to deliver safe and efficient molecules. With the tremendous technological developments happening in protein and DNA sequencing, pharmacogenomic approaches will profit from the availability of the human protein sequence providing clues to describe genetic networks and may ultimately initiate new ways of developing compounds. The availability of the human protein sequence together with the pharmacogenomic and pharmacogenetic approaches should contribute to a better selection together with a faster development of safer and more effective drugs. The availability of the human protein sequence shall contribute to reach this goal.