

EQUIPMENT FOR DNA AND PEPTIDE SYNTHESIS

It is difficult to overestimate the importance of DNA sequencing and synthesis methods to the development of biotechnology. Indeed, in the ten years since the first techniques were published, our knowledge of genetic sequences—and the proteins derived from them—has expanded so rapidly that at present it doubles about every twelve months. Even so, this is too slow to make a significant dent in the as-yet-undiscovered data—not only of the human genome but in our knowledge of the genomes of other species.

The need to increase the rate of data-capture in this area continues to drive the development of increasingly sophisticated methods to synthesize and test DNA probes, sequence longer stretches of nucleic acid, synthesize *de novo* proteins, and expand our understanding of the key structure and function relationships of biological macromolecules.



High performance DNA synthesizers. Milligen (Bedford, MA) introduces the 7500 DNA Synthesizer. This high performance, third generation synthesizer is designed for

the routine synthesis of small DNA probes and large DNA fragments. It includes a synthesis unit, a separate IBM-PC (or IBM compatible), and an innovative software package. The instrument-reagent system offers fast cycle times (five minutes per cycle typical) and low reagent usage (less than eight ml per cycle). Performance advantages include stepwise yields greater than 99 percent and a guarantee of 100-mer production on installation. Up to 500 couplings are possible without refilling reagent bottles, and three simultaneous syntheses can be performed. A precision, medium-pressure, microdelivery system optimizes reagent flow and usage. Amidites are dissolved anhydrously on the instrument—significantly reducing the risk of sequence-failures caused by moisture contamination. The software features voice verification of an entered sequence, automatic date entry of reagents and lot numbers through a bar code and light pen, on-line trityl monitoring, continuous self-diagnostics, and an extensive, time-saving notebook manager package.

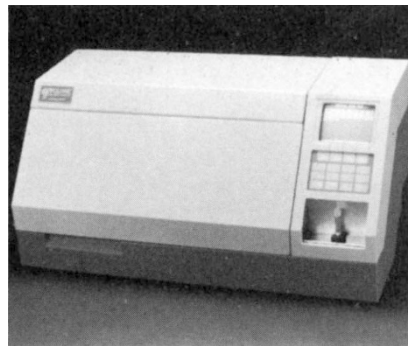
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Modular approach to instrumental DNA synthesis. The Cruachem (Herndon, VA) modular PS 200 DNA Synthesis System offers an affordable approach

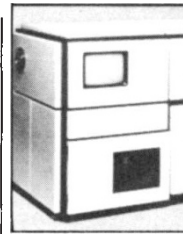
to instrumental oligonucleotide synthesis, with both interactive and fully automated synthesis capability. An existing interactive PS 200 system can be converted to a fully automated sequential two-column synthesis system by the addition of the PS 200 Autoinjection Module. The PS 200 DNA Synthesis System utilizes a non-dedicated computer (IBM PC or compatible) and sophisticated, easy-to-learn and use software. The investigator is given the choice of using pre-programmed protocols or creating a protocol unique to the specific application for which the system is being used.

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An advanced, reliable DNA synthesizer. Biosearch (San Rafael, CA), a subsidiary of the New Brunswick Scientific Company, announces the introduction of the Cyclone automated DNA synthesizer. This compact bench-top unit incorporates an easy-to-read CRT display, which guides even an inexperienced user through each phase. Reagents are conveniently packaged for direct use without complicated preparation. The Cyclone's design incorporates the use of preprogrammed memory cartridges that permit synthesis using the proven beta-cyanoethyl phosphoramidite chemistry, the new H-phosphonate synthesis protocols, as well as future methodologies as they become available. An advanced microfluid delivery system ensures reliability, reduced reagent consumption, and faster cycle times. Short fragments as well as sequences in excess of 100 bases can be prepared routinely and economically.

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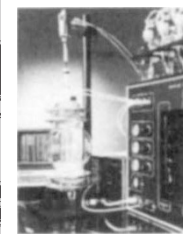
Efficient synthesis of complex peptides the first time.

The PSS-80 peptide synthesizer from Applied Protein Technologies (Cambridge, MA) features "reaction-optimization" through a combination of amino-acid-specific reaction protocols and real-time reaction monitoring. The system is a microprocessor-controlled, bench-top instrument providing 15 randomly accessible, refrigerated amino-acid reservoirs, and a wide range of reaction vessel sizes. Numerous reaction and operation sensors constantly monitor instrument performance. To the extent practically possible, all electrical and electronic components have been physically isolated from solvents and reagents, minimizing potential corrosion and other damage from possible leaks or noxious vapors. The PSS-80 can produce 10 mg to more than 20 grams of peptide resin.

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Fully automated protein/peptide sequencing. The Applied Biosystems (Foster City, CA) Model 477A Sequencer/Model 120A PTH analyzer system automates the determination of amino acid sequences of proteins and peptides. The Sequencer's operation is based on sequential degradation chemistry and it incorporates a new Pulsed Liquid™ technology. The PTH Analyzer uses gradient micro-bore chromatography to separate and detect the products of this degradation. The Sequencer controller collects and analyzes chromatographic data to interpret the sequence information.

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Large-scale peptide synthesizer.

The Coupler® 296 from Du Pont (Wilmington, DE) is billed as the largest capacity solid-phase peptide synthesizer, and the first fully automated device capable of producing up to 500 grams of peptide in a single batch. The instrument performs a wide variety of syntheses to GMP standards, using such common blocking groups as BOC, benzyl, t-butyl, and FMOC, with such coupling strategies as DCC and active-ester.

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