1 June 1984 • Vol. 224 • No. 4652

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SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

BIOSYSTEMS UPDATE

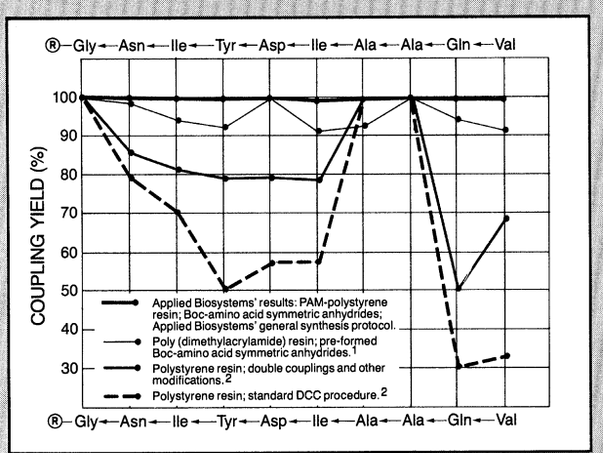
A New Approach to Automated Peptide Synthesis

Applied Biosystems is pleased to announce the first instrument designed for high efficiency peptide synthesis. The key to the high coupling yield of the Model 430A Peptide Synthesizer is an activation unit which converts the amino acid to a very efficient acylating species immediately prior to the coupling step. The defined protocol has been optimized for general peptide synthesis, but the fully programmable system allows straightforward adaptation to other chemistries.

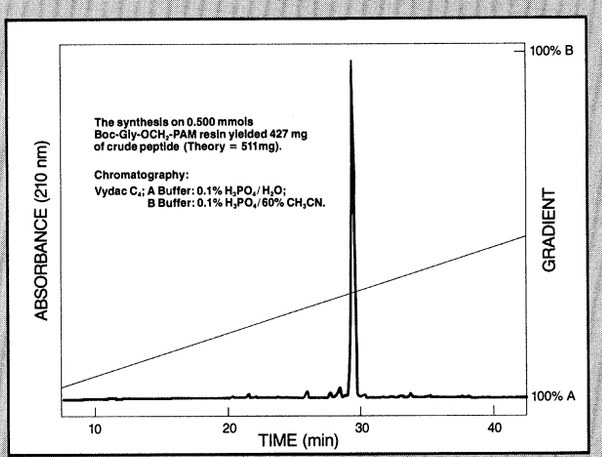
Cycle times with the general synthesis protocol are approximately one hour. A single loading of protected amino acids, reagents, and solvents will give up to 50 synthesis cycles. To insure high coupling yields, Applied Biosystems manufactures and supplies all synthesis reagents.

The data below summarize the results of the synthesis of the decapeptide Acyl Carrier Protein (65-74). These results illustrate the combined capabilities of the novel automated synthesis procedure and the high quality peptide synthesis reagents and loaded resins.

The new Model 430A Peptide Synthesizer was introduced at FASEB and Analytica, and will be exhibited at the ASBC Meeting. Write or phone if you'd like more information.



Amino acid incorporation during assembly of Acyl Carrier Protein residues 65-74.



HPLC chromatogram of crude, HF cleaved Acyl Carrier Protein (65-74).

ANALYTICAL METHOD	STEP YIELD (%)									
Quantitative Ninhydrin Monitoring[3].	—	99.9	99.6	99.5	99.4	99.1	99.2	99.2	99.1	98.9
Preview Quantitation by Solid Phase Sequencing of Protected, Resin Bound Peptide[4].	—	—	99.4	—	99.3	99.1	99.2	—	98.9	98.7
	RELATIVE AMINO ACID EQUIVALENTS									
Amino Acid Analysis of HF Cleaved, Deprotected Peptide	1.00	0.97	0.90	0.94	0.97	0.90	0.96	0.96	0.94	0.98
Amino Acid Residue	Gly	Asn	Ile	Tyr	Asp	Ile	Ala	Ala	Gln	Val

Step yield quantitation and amino acid analysis results for Acyl Carrier Protein (65-74) chain assembly using Applied Biosystems' general synthesis protocol. Only single couplings were used throughout the synthesis (except for Gln).

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2. W.S. Hancock, D.J. Prescott, P.R. Vagelos, and G.R. Marshall, *J. Org. Chem. 38* (1973) 774
3. Virender Sarin, Stephen B.H. Kent, James P. Tam, and R.B. Merrifield, *Anal. Biochem. 117* (1981) 147–157
4. Stephen B.H. Kent, Mark Rieman, Mary LeDoux and R.B. Merrifield, *Proc. Int'l. Conference: Methods of Protein Sequence Analysis*, 1982

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COVER

Young chambered nautilus (*Nautilus belauensis*) captured at a depth of about 300 meters, after mark and release off Mutremdiu Point, Palau. Mark and recapture data indicate that this species grows to full size in 14 to 17 years and that the life-span may exceed 20 years. See page 990. [W. B. Saunders, Department of Geology, Bryn Mawr College, Bryn Mawr, Pennsylvania 19010]

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"CANCER THERAPY; WHERE DO WE GO FROM HERE"

This workshop, which is sponsored by the General Motors Cancer Research Foundation, has been organized by Drs. Emil Frei III and Emil J. Freireich. It will be held at the Sojourner Inn, in Jackson Hole, Wyoming, September 14-15, 1984. The workshop will consist of a four hour morning session and a two hour evening session on the first day, followed by a four hour morning session on the second day. The intermediate time may be employed for informal scientific discussions.

The purpose of the workshop is to bring together established investigators who have contributed conceptually and importantly to disciplines relating to cancer therapy. They have been asked to present the directions of research that cancer therapy may or should take in the immediate and more long range (5-10 years) future. Ample time will be allowed for discussion.

The tentative program is as follows:
Clinical Chemotherapy—E. Frei III and E. Freireich
The Surgeon—S. Rosenberg
Radiation Oncologist—T. Phillips
Drug Resistance—J. Bertino
The Discovery of New Agents:
Industry—G. Hitchings
Academia—A. Sartorelli
National Cancer Institute—V. DeVita
Tumor Stem Cells—S. Salmon
Pharmacology—E. Mihich
Proliferation and Differentiation—E. McCulloch
The Genetic Basis of Response to Therapy—A. Knudson
Cytogenetics and Therapy—J. Yunis
Cytokinetics and Treatment—B. Clarkson
Oncogenes and Treatment—M. Wigler
Monoclonal Antibodies and Treatment—H. Kaprowski
Invasion and Metastases—R. Kerbel
Regulation of Differentiation and Proliferation—R. Reisfeld

Upon receipt of your registration, you will receive confirmation and further details on the workshop including lodging and transportation. Registration limited to 100 people. Payment must accompany registration. No credit cards please. Please make checks payable to: General Motors Cancer Research Foundation/JH.

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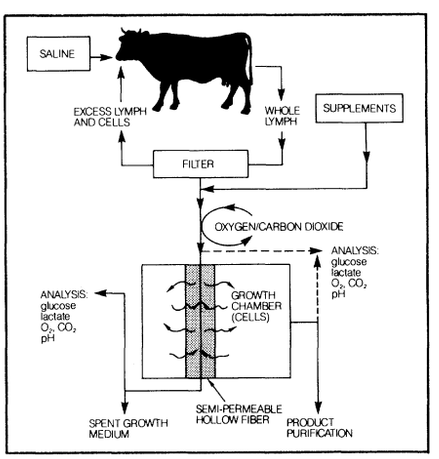

Insufficient quantities of desired peptides are a key cause of expensive research and production delays. The MCT system is a *new* and *unique* mammalian cell culturing process designed to overcome the obstacle of insufficient quantities of peptides by delivering the quantity you need...*when you need it!* Additionally, every step in MCT production has been developed to contain costs now and in the future while maintaining exceptional purity and quality in mammalian cell proteins.

Quantity

Unlike conventional cell-culture methods, the MCT system uses "fresh," free-flowing lymph directly from a cow. Following treatment, the lymph is continuously diffused into and out of a growth chamber. This nearly *in vivo* growth environment stimulates continuous and optimal protein secretion. The result? Large quantities of desired proteins enabling you to move to the clinic or market...*faster.*

Cost

Unlike conventional cell-culture methods that require extensive labor forces and expensive growth mediums, Bio-Response's MCT is a closed, steady-state system. In essence, the MCT system starts with a low-cost lifeline—a feeding cow—and ends with a pure, quality product. MCT *...an optimal system at low cost.*

Purity

Unlike conventional cell-culture methods, the MCT system is designed to insure purity without tedious processing. By directing the lymph across semi-permeable membranes, MCT provides both separation of media protein from desired cell products, and a continuous nutrient flow. The ability to add or withdraw from the chamber to maintain optimal cell density permits continuous harvest of a highly pure product.

Quality

Unlike conventional methods of production that attempt to create biologically active mammalian cell products, the MCT system provides a pure-mammalian product—an exact copy of the original protein and, in the case of non-antibody polypeptides, uncompromised by inappropriate glycosylation and disulfide bond formation. There is a growing consensus favoring products produced in a mammalian cell-culture system, such as the Bio-Response MCT system.

For further information, call Bio-Response, Inc. at (415) 786-9744.

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1 June 1984, Volume 224, Number 4652 **SCIENCE**

The Minority Student Challenge

Although yesterday's demagogues no longer bar the schoolhouse doors, the retreat from the crudest forms of educational discrimination has not automatically brought expected gains for minority students.

Nowhere are problems of access and opportunity more persistently acute than in graduate and professional study in science and technology. Blacks, Hispanics, and Native Americans make up 19 percent of the U.S. population but receive only 8 percent of doctoral degrees annually. Moreover, according to a 1983 survey supported by the Rockefeller Foundation,* the disciplines "in which the four minorities [Blacks, Hispanics, and Asian and Native Americans] are most severely underrepresented are engineering, biological science, and physical science and mathematics." The same investigation found that Blacks are proportionately in the shortest supply across the entire spectrum of quantitative degree curricula.

In the 1981–82 academic year, for example, 606 Blacks nationwide received doctorates in education, but only 20 took Ph.D.'s in engineering, 29 in the physical sciences, 6 in mathematics, and 1 in computer science. In the same year, Hispanics earned 132 doctorates in arts and humanities and 136 in the social sciences but only 33 in the physical sciences and 6 in mathematics.

The shocking numbers make it hard to avoid a dispiriting conclusion: that in graduate and professional education, as in so many other areas of American life, the facade of progress that has been erected in recent years actually masks the reality of sluggish change. Particularly as the United States confronts the challenging uncertainties of a high-tech future, minorities urgently need to increase their numbers on the national roster of scientists and professionals.

What can educators and policy-makers do to help? At a minimum, a two-pronged strategy is indicated.

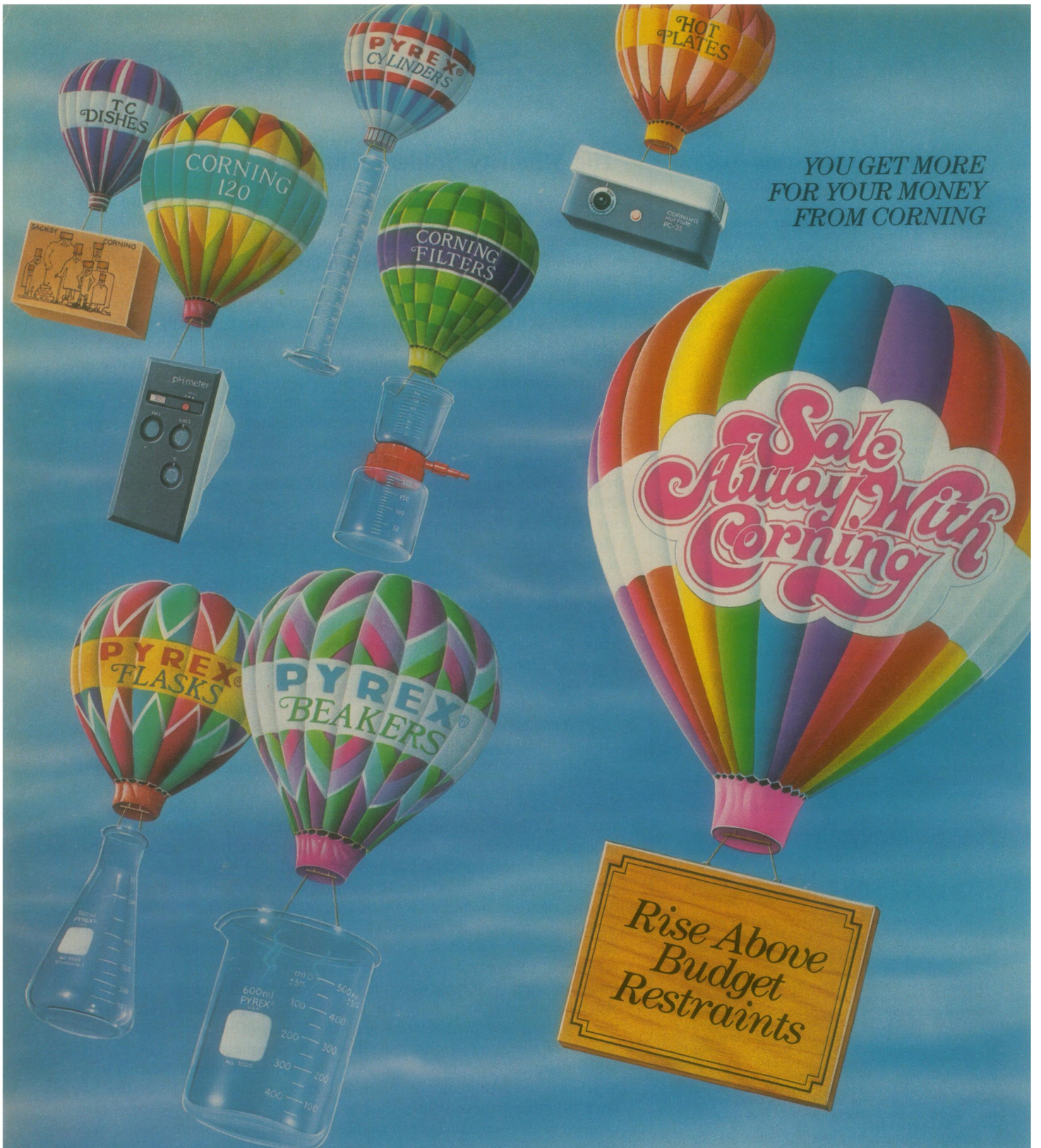
First, for minorities already enrolled as undergraduates, we need energetic, well-organized programs to stimulate interest in professional schools and doctoral study in science, mathematics, and technology. Whenever necessary, such efforts must include programs to rectify high school deficiencies or gaps in the academic prerequisites for entry into these fields. Effective tutoring and developmental components will also ensure that less well-prepared students will be able to compete without harsh disadvantage and to meet rigorous standards without special dispensation.

Second, for younger minorities—those currently in elementary or the early years of secondary school—we need to discourage the frequent practice of routinely counseling many minority youths into vocational and trade curricula, as if they were unfit for more rigorous college choices. We also must interdict the "cycle of avoidance," in which lack of preparation in basic science and mathematics leads to a lack of interest, anxiety, and ultimately nonenrollment in those fields at the college level. Indeed, high schools and colleges must cooperate to develop academic and career paths in science and technology for promising minority students. To do that, we have to interest these youths during their early secondary years in high-demand professional and technical fields and to provide both special study options and financial incentives to take advantage of them.

Less than a year ago, Lieutenant Colonel Guy S. Bluford, Jr., became the first minority American to travel into space. Colonel Bluford's achievement appeared to affirm that minorities have entered the national mainstream—that their needs and priorities have climbed on the country's agenda even as the aptly named Challenger climbed into the sky.

But it is a long way from the back of the bus to the cockpit of a space shuttle. Until minorities close the "grad school gap" in scientific and professional education, the real challenge to the nation will remain unanswered.—CLIFTON R. WHARTON, JR., *chairman of the board, Rockefeller Foundation, and chancellor, State University of New York, Albany 12246*

*National Research Council, "Survey of earned doctorates" (Washington, D.C., 1983).



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AAAS members are invited to submit symposium proposals for the next Annual Meeting in Los Angeles, 24–29 May 1985. Please complete the form below, attach a "Synopsis of Objectives" (about 200 words), and send it to us **not later than 1 August 1984.**

We are particularly interested in symposia dealing with the latest developments in science and technology, and the implications of these developments for society.

All symposium proposals are subject to review. If the information submitted is inadequate for reviewing, the proposal will be returned. Endorsement (sponsorship) by a AAAS Section Committee expedites the review process. It is therefore in the interest of the proposer to send a *copy* of the proposal to the appropriate Section Secretary (see table of contents page of *Science* for names) for endorsement at the same time the *original* is sent to the AAAS Meetings Office.

Speakers should *not* be confirmed at this time; however, sufficient information about probable speakers and their topics should be provided to allow for evaluation of the proposal.

You will be notified in **October** about acceptance, conditional acceptance, or non-acceptance of your proposal. Further information will be provided at that time. If accepted, your preliminary program with confirmed speakers is due in **November,** and your final program copy, suitable for publication, is due in **January.**

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1. Speaker _____
Affiliation _____
Topic _____

2. Speaker _____
Affiliation _____
Topic _____

3. Speaker _____
Affiliation _____
Topic _____

4. Speaker _____
Affiliation _____
Topic _____

5. Speaker _____
Affiliation _____
Topic _____

6. Speaker _____
Affiliation _____
Topic _____

PLEASE ATTACH SYNOPSIS OF OBJECTIVES OF PROPOSED SYMPOSIUM (APPROXIMATELY 200 WORDS).

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1984 REGIONAL MEETING OF THE INTERNATIONAL UNION OF PHYSIOLOGICAL SCIENCES

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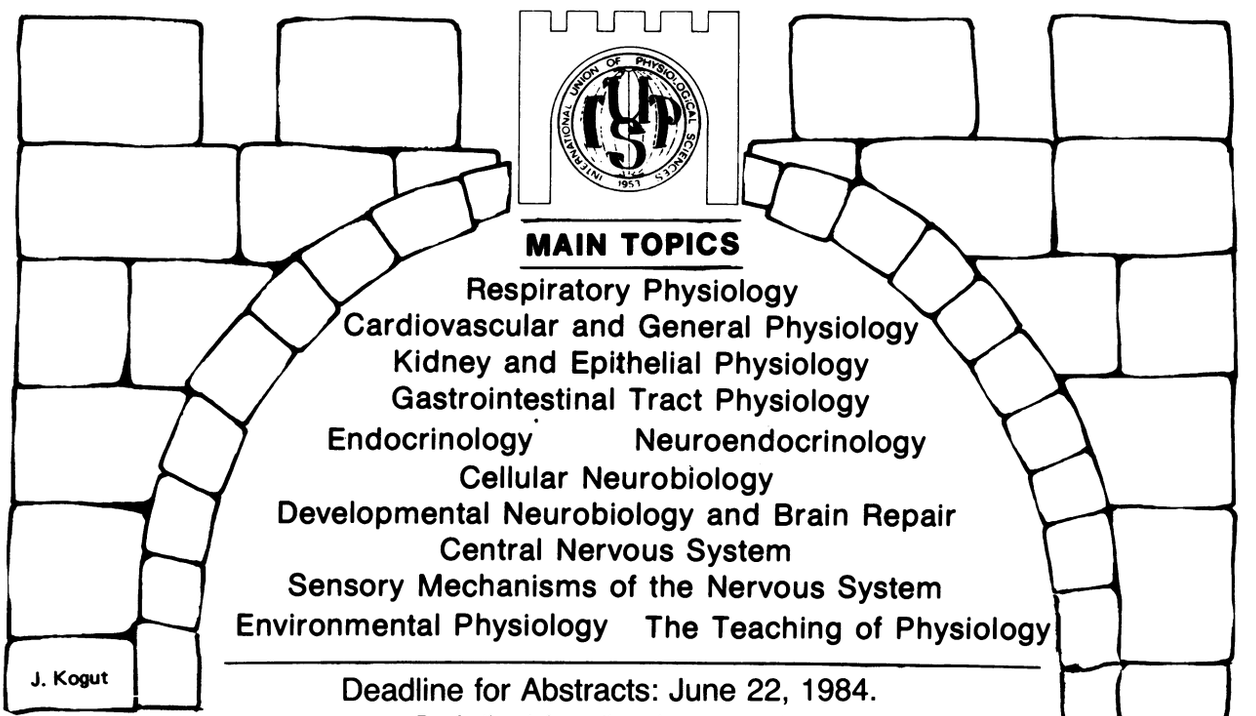

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