CYANONEWS

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CYANONEWS is intended to provide cyanobacteriologists with a forum for rapid informal communication, unavailable through journals. Everything you read in this newsletter is contributed by readers like yourself. If you have a new result, if you know of an interesting meeting, if you have a post-doctoral opening, if you want strains, if you've published/submitted an article, if you have an insight or speculation into the cyanobacterial world... why not tell us about it? It's news to us. Your ADDRESS LABEL shows the date of your last communication. If that was more than two years ago, please send some message, if only to tell us that the address is still correct and you're still interested (but since you're writing anyway, a little news couldn't hurt).

Please send all contributions to one of the addresses listed on the last page. DEADLINE for the next issue is JUNE 1, 1988.

The name of the CORRESPONDENT for each item in this newsletter is capitalized, so you know who to write to for more information. The CORRESPONDENT'S ADDRESS appears at the end of the newsletter.

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The annual meeting of the Phytochemical Society of North America will feature a SYMPOSIUM ON RECENT DEVELOPMENTS IN PRIMARY AND SECONDARY NITROGEN PHYTOCHEMISTRY. The meeting will be held at the University of Iowa, June 26-30, 1988. It is not restricted to PSNA members. Funds are available allowing travel assistance for graduate students giving oral presentations. For more information, contact J.E. Poulton, Dept. of Botany, The University of Iowa, Iowa City, Iowa 52242, U.S.A. (tel.) 319-335-1322.

Plön, West Germany, will be the site of the XIth INTERNATIONAL SYMPOSIUM ON CYANOPHYTE RESEARCH, to be held July 30 - August 10, 1989. The program will be organized with alternating blocks of formal presentations and microscope work. Inquiries should be directed to: Barbara Hickel, Max-Planck-Institute for Limnology, Department of Microbial Ecology, August-Thienemann-Straße 2, D-2320 Plön, F.R. Germany. (Tel) (0049) 4522 802 (1) 252.

There will be a TRAINING COURSE IN MASS CULTURES OF MICROALGAE held July 17-29, 1988, at the Jacob Blaustein Institute for Desert Research. The aim of the course is to have students acquire tools for monitoring, analyzing, and solving practical problems prevalent in large-scale cultivation of microalgae. Lectures will be accompanied by practical work, both in the laboratory and outdoors. The fee of U.S. $800 includes room and board on campus and a two day tour of the southern part of Israel. A B.Sc. in biological science (or an equivalent university degree) is prerequisite. Applications should include a C.V., and a letter of recommendation should be sent on behalf of the applicant. For more information and registration, contact: Avigad Vonshak, The Laboratory for Microalgal Biotechnology, The Jacob Blaustein Institute for Desert Research, Ben-Gurion University at Sede-Boker, 84993, Israel.

PETER WOLK is organizing a 10-day BACKPACKING TRIP to the Muir Wilderness of California for this summer (June 28 - July 11, or September 6 - 17, 1988. Other dates are possible). If you are interested in participating, contact him at 517-353-2049, or write promptly, as the wilderness supervisor fills requests for permits for specific dates on a first-come, first-served basis starting early in March. The trip offers splendid scenery, good exercise, and a fine chance to become better acquainted with other cyanobacteriologists.

MONOGRAPH APPEARS ON PHILIPPINE NITROGEN-FIXING BLUE-GREEN ALGAE

A special issue of The Philippine Agriculturist has appeared (Vol. 69, no. 4B, 1986), entitled "Studies on Nitrogen-Fixing Blue-Green Algae and Their Symbiotic Forms in the Philippines", M.R. Martinez, P.A. Roger, and B.L. Mercado, eds. Most of the twelve papers included in the issue are devoted to the biochemical characterization and ecology of cyanobacteria of the Philippines, aimed at understanding their role in regional nitrogen fixation and their exploitation in agriculture beyond wetland rice. The issue is 120 pages and sells soft bound for U.S. $10 (includes handling and surface mailing). Contact the CA Publications Office, Basement, International House Bldg., UP at Los Banos, College, Laguna. Tel. 2379.

NOMENCLATURE RULES FOR CYANOBACTERIAL GENES PROPOSED

JEAN HOUMARD and NICOLE TANDEAU DE MARSAC have finished updating a compilation of cloned cyanobacterial genes (which will appear in Methods in Enzymol., A.N. Glazer and L. Packer, eds., 1988). Having surveyed the current state of affairs, they think it is time to try to standardize the nomenclature of cyanobacterial genes. With this in mind they have proposed the following rules:

(1) Gene designations proposed for Escherichia coli and/or Bacillus subtilis must be used whenever possible.

(2) For functions specifically related to photosynthesis, gene designations employed for photosynthetic bacteria or plants can be used.

(3) Designations already in use for bacterial genes must be avoided if the cyanobacterial gene products have not been identified or are functionally different from those previously published.

(4) Genes that are involved in the formation of multimolecular complexes (structure, assembly, and/or regulation) or that are part of a given metabolic pathway can be designated by different capital letters appended to a unique three lower-case letter root. The following are given as examples:
   - apcA to apcZ - genes related to allophycocyanin
   - atpA to atpZ - genes related to the ATPase complex
   - cpcA to cpcZ - genes related to phycocyanin
   - cpeA to cpeZ - genes related to phycoerythrin
   - metA to metZ - genes related to the methionine biosynthetic pathway
   - nifA to nifZ - genes involved in nitrogen fixation
   - psaA to psaZ - genes related to photosystem I
   - psbA to psbZ - genes related to photsystem II

(5) Arabic numerals following a gene designation are used to identify the various copies within a multigene family (e.g., psbA1, psbA2, psbA3, ...).

(6) The allele numbers of a given locus must be identified by arabic numerals preceded by a hyphen (e.g. atpA-1, cpcB2-1, psbD1-3), ...).

LIST OF CYANOBACTERIAL REFERENCES FOR 1986 AVAILABLE

If your appetite for cyanobacterial references is unsated, then you'll be happy to hear that JEFF ELHAI has made available a (nearly) exhaustive list of 1986 references concerning cyanobacteria in journals covered by Science Citation Index. There are about 440 of them, residing on a floppy diskette. If you would like a copy, and have access to a personal computer that can read 5-1/4 inch disks formatted by either CP/M or MS-DOS, please send him a note specifying which format you would prefer (you can if you like include a disk along with the request). If you don't have access to a computer that can read such a disk, a printed copy is available (55 pages), but only as a last resort. The list is only (nearly) exhaustive, because some titles that don't have the word "cyanobacteria", "blue-green algae", or derivatives, or a generic name would have been missed by the computer search. After laboring a few hours over the keyboard, J.E. would like to make the suggestion that authors sacrifice a small measure of their poetic freedom to the computer and struggle to find a place for "cyanobacterium" in their titles.

SUBUNIT STRUCTURE OF CYANOBACTERIAL RNA POLYMERASES DISTINGUISHES BLUE-GREENS FROM EUBACTERIA

BOB HASELKORN sent us some hot stuff from the thesis of George Schneider, part of which recently appeared (Schneider, et al., J.Biol.Chem.). Anabaena RNA polymerase contains five kinds of subunits:

- α - related to E.coli α
- β - strongly related to E.coli β, contains the nucleotide binding site.
- β' - weakly related to E.coli β'
- γ - 66 kDa protein related to E.coli β' (!)
- σ - 52 kDa, related to E.coli σ^{70}.

stoichiometry: $\beta'\beta\gamma\alpha_2\sigma$ for holoenzyme, $\beta'\beta\gamma\alpha_2$ for core.

All cyanobacteria tested to date (15 species) have the γ subunit. This distinguishes them from all other eubacteria and places them, as a group, closer to archaebacteria.

PHOTOSYSTEM II DONOR D (AND Z?) IDENTIFIED

WIM VERMAAS tells us a tale of a recent discovery. For years, Z, the donor to the Photosystem II (PSII) reaction center, and D, an oxidizable PSII component structurally resembling Z, were assumed to be plastoquinols. This assumption rested essentially on a variety of EPR and ENDOR measurements made on the oxidized donors. However, the observed stoichiometry of extractable plastoquinone and other PSII components could not account for Z and D.

So what, in fact, is Z and D? Independently, Gerry Babcock, Bridgette Barry, Rick Debus, and Lee McIntosh at Michigan State University and Vermaas' group at Arizona State University considered the possibility that Z and D instead of quinols were tyrosyl residues in D1 (encoded by psbA) and D2 (psbD). Tyrosine radicals might be expected to yield similar signals as those seen in PSII by EPR and ENDOR. Recently, Barry and Babcock showed by selective deuteration experiments that, indeed, D and Z probably were tyrosine residues.

But which tyrosine? Both groups guessed Tyr-161 residues in D1 and D2 (using residue numbering as in spinach). The rationale was that the two tyrosine residues are: (a) conserved in all species for which a D1 or D2 sequence is available, and (b) expected to be virtually adjacent to the histidine residues associated with P680-binding. Therefore, simulataneously and independently at both ASU and MSU, this tyrosine residue in D2 was targeted for site-directed mutatgenesis (changing it into phenylalanine), using the Synechocystis 6803 system. The site-directed mutant was found to have lost EPR Signal IIs (and thus D^+), and to have reduced photoautotrophic growth. Vermaas' group also altered the adjacent methionine residue to an argenine. This did not lead to the disappearance of the EPR signal, thus, the loss of Signal IIs was specifically correlated to alteration of the Synechocystis Tyr-160 residue (homologous to spinach Tyr-161) in D2. This argued persuasively that this tyrosine residue in D2 indeed is D, and by analogy, that the homologous tyrosine residue in D1 is Z.

One lesson from this tale is that site-directed mutagenesis in Synechocystis 6803 is a powerful and relatively simple tool for the analysis of structure and function of PSII components. However, Wim pointed out another lesson: the unintentional duplication of effort by the MSU and ASU groups is proof of how important it is to have a frequent information exchange between the various groups working on directed mutagenesis. This exchange should not only cover what has been done, but also what will be done. Perhaps Cyanonews would be a suitable forum for this? [See Publication section for reference to work by Debus, et al.]

MEETING REPORTS ON RESPONSES OF CYANOBACTERIA TO STRESS

[The following are two reports left over from last newsletter's summary of two meetings: Molecular Biology of Photosynthetic Prokaryotes (June 8-10, 1987) and Second Workshop on the Molecular Biolgoy of Cyanobacteria (July 17-19, 1987)]

David Laudenbach reported on the regulation of ferredoxin and flavodoxin genes. The genes encoding these proteins have been cloned from Anacystis nidulans R2, and Southern hybridization analysis indicates that each gene exists in single copy. The gene encoding ferredoxin is transcribed constitutively whereas the flavodoxin mRNA appears only in a medium low in iron and disappears upon the readdition of iron. The ferredoxin gene is transcribed as a monocistronic message. The flavodoxin gene, however, is transcribed on a polycistronic message. Two unidentified open reading frames are also on this message.

Work presented by Malcolm Potts concerns the response of Nostoc commune to dessication. He is interested in the effects of water stress on gene expression in both laboratory and field samples. Two genes in particular were investigated: the gene encoding the large subunit of RNA polymerase and the gene encoding alkaline phosphatase. The latter was cloned and expressed in E. coli under control of its own promoter.

- contributed by FLORENCE GLEASON and TOIVO KALLAS

CORRECTIONS*CORRECTIONS*CORRECTIONS*CORRECTIONS*CORRECTIONS*CORRECTIONS*CORRECTIONS*CORRECTIONS*CORRECTIO

The summary of the Cyanobacterial Workshop in the last newsletter reported that one of Valdis Dzelzkalns' dextrose-requiring mutants owed its phenotype to a deletion in psbD. Actually, at the time of the Workshop, he had narrowed the deletion to a fragment that spans psbD and psbC. Since the time of the meeting, he has finished sequencing both the wild type and mutant copies of this region and has found that the deletion is in psbC.

The recent Directory of Cyanobacteriologists had several misprints, but one major blunder warrents correction. Andriana Pantazidou was listed as Pantazidou Andriana and therefore was misplaced amongst the A's. Secondly, A.P., who has never heard of Eudolithic cyanobacteria, works instead on the endolithic variety.

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