1991 PROGRAM

A.M.

9:00 **Registration and Coffee—Room 137, Chemistry-Physics Building**

9:30 **Welcome by Dr. Robert Hemenway, Chancellor, University of Kentucky, Room 139, Chemistry-Physics Building**

9:40 **Introductory Remarks—Dr. Robert Rhoads, Department of Biochemistry, University of Kentucky**

9:45 **Dr. Michael B. Mathews, Cold Spring Harbor Laboratory, New York**
Viruses, Interferon, RNA and the Control of Protein Synthesis.

The initiation of protein synthesis can be controlled by of the phosphorylation of one the initiation factors, eIF-2, that catalyses an early step in the pathway. Cells make use of this mechanism to regulate the translation of their own mRNA. In the presence of interferon, they also exploit this mechanism to establish an anti-viral state which prevents virus multiplication and limits the spread of infection. Several viruses have elaborated countermeasures to protect themselves against cellular defenses. These counter-measures include inhibitors of the protein kinase that phosphorylates eIF-2. Both activation and inhibition of the kinase are regulated by viral RNA molecules, presenting interesting problems in RNA-protein recognition.

10:45 **Discussion**

10:50 **Dr. Hans Trachsel, University of Bern, Switzerland.**
eIF-4, Mediators of mRNA Binding to Ribosomes

In eukaryotic cells the binding of ribosomes to mRNA is mediated by translation initiation factors of the eIF-4 group. They guide the ribosomes to the 5' region of the mRNA, facilitate scanning of the mRNA by the ribosome in the 5' to 3' direction and selection of the correct AUG for translation initiation. In an alternative initiation pathway, ribosomes bind internally to mRNA through recognition of special RNA structures. To study ribosome binding to mRNA and its regulation in more detail we have chosen the yeast *S. cerevisiae* as a model system. We have isolated yeast translation initiation factors, cloned their genes and developed cell-free translation systems which are dependent on a mRNA binding factor for translation initiation. These systems are suitable to study the factor requirement(s) for translation of individual mRNAs as well as structure-function relationships of translation initiation factors.

11:50 **Discussion**

P.M.

12:15 **Buffet Lunch, Faculty Club (Please return card by April 9, 1991 for reservations. Cost $6.00 to be paid at registration.)**

1:30 **Dr. Richard J. Jackson, University of Cambridge, England**
The Novel Mechanism of Initiation of Translation of Picornavirus RNAs

The selection of the correct initiation site for translation of messenger RNA is a key step, crucial for accuracy and efficiency of protein biosynthesis by ribosomes. For the vast majority of eukaryotic cellular mRNAs and most viral mRNAs this appears to be achieved by an end-dependent scanning mechanism: the ribosome binds first at the end of the mRNA and then scans the sequence until it finds the first AUG trinucleotide codon which is used for the initiation site. Picornaviruses (e.g. poliovirus, common cold virus, etc.) represent an intriguing departure from this normal mechanism: a ~450 nucleotide segment of the viral RNA causes ribosomes to bind directly to a site situated just downstream of this region, without scanning from the end of the RNA.

2:40 **Discussion**

2:50 **Dr. Robert E. Thach, Washington University, St. Louis**
Mechanisms of Regulation of Individual mRNA Translation Rates

Various mechanisms which allow individual mRNAs to be selectively translated at rates different from the average will be considered. The regulation of ferritin mRNA translation will be discussed in detail. Three or more elements regulate ferritin mRNA translation in response to the iron supply. The first element identified was a 28 nucleotide sequence which confers iron responsiveness to a downstream open reading frame. The second element found was a 90 kDa protein that binds specifically to the iron responsive element, where it prevents translation of a downstream open reading frame. A third element, "the ferritin inducer," has recently been investigated. This is a metabolite of iron which interacts with the ferritin repressor protein to relieve the repression of ferritin mRNA translation.

3:50 **Discussion**

4:00 **Mixer.**

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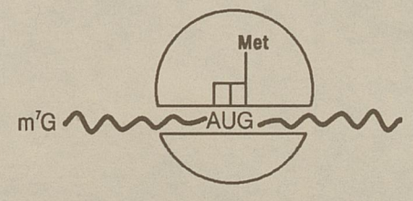
TRACHSEL
THATCH
JACKSON
MATTHEWS

NEXT YEAR:
1. VIDEO
2. WATER FOR SPEAKERS
3.

Seventeenth Annual
Symposium on

Chemistry & Molecular Biology



established in the memory of
Anna S. Naff

INITIATION OF PROTEIN SYNTHESIS IN EUKARYOTES

SPEAKERS

Michael B. Mathews
Hans Trachsel
Richard J. Jackson
Robert E. Thach

Thursday, April 18, 1991
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