especially to Carol Harley, Nia Bryant and Bülent Tugal who helped with their
notes and memories of the meeting. I also would like to acknowledge the support
of the British Society for Cell Biology, the Biochemical Society and the Wel come Trust in allowing me to attend the meeting.

References
18 Potenza, M., Bowser, R., Muller, H. and Novick, P. (1992) Yeast 8, 549-558

STELLA M. HURTLEY
Department of Biochemistry, University of Edinburgh Medical School, Hugh Robson Building, George Square, Edinburgh, UK EH3 9XD.

The yeast open reading frame encoding a dual specificity phosphatase

The vaccinia virus encodes a phosphatase (VHI) which shows amino acid sequence
similarity to the protein tyrosine phosphatases (PTPases). The VHI phosphatase can
phosphorylate proteins that have phospho-Ser, Thr or Tyr residues, a feature which distinguishes this
catalyst from other PTPases1. In the fission yeast Schizosaccharomyces pombe, the
VHI protein is required to
dephosphorylate a specific Tyr residue
(Tyr15) in p34cdc25. The dephosphorylation leads to activation of p34cdc25 and
the onset of mitosis. Sequence similarity between VHI and p34cdc25 suggested a
catalytic mechanism by which the VHI
gene product would dephosphorylate p34cdc25 (Refs 2, 3).

Many viral genes have cellular
counterparts that play important roles in
signal transduction (e.g. myc, src).
We have found that the viral-encoded VHI
phosphatase has sequence identity with a
protein encoded by an open reading frame
(ORF) located 3' to the Saccharomyces
cerevisiae DALI gene, which encodes
allantoisamine and is located on chromosome
IX (Ref. 4). Figure 1 shows the alignment of the
protein encoded by the yeast ORF with
VHI. The degrees of amino acid identity
between the two proteins is 30%. Due to
the 30% sequence identity between the yeast
ORF and VHI, we have referred to the yeast
gene as VYHI (for yeast VHI). To
demonstrate that the 364-amino acid yeast
protein was a phosphatase, the yeast gene
was cloned into a glutathione Stransfere vector-expression system and the
recombinant fusion protein was purified
by affinity chromatography. The yeast fusion
protein was active toward 32P-labeled Ser
and Tyr residues in phosphoproteins. In
addition, a number of residues known to
be important in the catalytic mechanisms
the PTPases are conserved in VYHI. These
include the invariant His-Cys sequence
located at the active site of the PTPases
as well as several highly conserved basic
residues thought to be important for
substrate binding4. Although the function of the
vaccinia phosphatase is unknown, it would
presumably have rather dramatic effects
upon Ser, Thr and Tyr phosphate content
in cells infected with the virus.
Understanding the role of VYHI in cellular
regulation should be possible by use of
yeast genetics. In addition, the possibility
that the VYHI function in yeast will also
provide clues to the pathogenic role of VHI
in viral infection and/or replication should
not be overlooked. Finally, it is likely that
higher eukaryotes will also have homologs
to the VYHI gene.

References

K. GUAN, D. HAKES AND J. E. DIXON
Department of Biological Chemistry, The University of Michigan Medical School, Ann Arbor, MI 48109-0006, USA.

D. PARK AND T. G. COOPER
Department of Microbiology and Immunology, University of Tennessee, Memphis, TN 38163, USA.

PROTEIN SEQUENCE MOTIFS

Figure 1
Sequence comparison between the S. cerevisiae VYHI gene product and the vaccinia virus
VH1 protein phosphatase. Letters in black correspond to identical amino acids. "Denotes the
Cys residue necessary for catalysis.

© 1993 E.

TIBS 18 - JANUARY 1993