

A major antigen from *Mycobacterium tuberculosis* which is homologous to the heat shock proteins groES from *E.coli* and the htpA gene product of *Coxiella burneti*

Paul N.Baird, Lucinda M.C.Hall and Anthony R.M.Coates

Department of Medical Microbiology, London Hospital Medical College, Turner St., London, E1 2AD, UK

Submitted August 15, 1988

Accession no. X12598

The groE locus gene of *E.coli* (1) and an operon of *C.burneti* (2), each produce two major heat shock proteins of about 60k and 10k. The 60k products of the groEL gene of *E.coli* and the htpB gene of *C.burneti* have been shown to be homologous to the 65k antigen of *M.tuberculosis* (2,3). We have reported the sequence of a 10k protein antigen of *M.tuberculosis* (fig.1) (4), which is recognised by sera from tuberculosis patients (4). We now show homology between the 10k antigen of *M.tuberculosis* and heat shock proteins of *E.coli* and *C.burneti* (fig.1). The *M.tuberculosis* 10k protein comprises 99 amino acids and is 44% homologous with the groES gene product of *E.coli* and 43% homologous with the htpA gene product of *C.burneti*. This suggests that the 10k protein of *M.tuberculosis* will be found as widely amongst different organisms as the 65k protein (6).

```

E.coli groES      MNIRPLHDRVIVRKRKEVETKSAGGIVLTGSAAAKSTRGEVLAVGNGRILENGEVK-PLDVKVDIVIFNDGVKSEKIDNEEVLINSESDILAIVEA
                * * * * *
M.tuberculosis 10k AKVNIKPLEDKILVQANEAEITTFASGLVLPDTAKEKPEQEGTVAVGPGRWDEDEGRIPLDVAEGDTVIYSK-YGGTEIKYNGEELYILSARDVLAVVSK
                * * * * *
C.burneti htpA   MKIRPLHDRVVRRLLEERT-SAGGIVIPDSAAEKPSRGEVIVGPGKPLDNGEVR-SLDVVKDQILFGK-YAGTEVKLACDEYIVAREDDIMGVIEK

```

Figure 1. Homology between the 10k antigen of *M.tuberculosis*, *E.coli* groES and *C.burneti* htpA gene products. (*) shows amino acids conserved.

References

- Hemmingsen, S.M., Woolford, C., van der Vies, S.M., Tilly, K., Dennis, D.T., Georgopoulos, C.P., Hendrix, R.W. and Ellis, R.J. (1988) Nature 333:330-334.
- Vodkin, M.H. and Williams, J.C. (1988) J. Bact. 170:1227-1234.
- Shinnick, T.M., Vodkin, M.H. and Williams, J.C. (1988) Infect. Immun. 56:446-451.
- Baird, P.N., Hall, L.M.C. and Coates, A.R.M. (1988) submitted for publication.
- Sanger, F., Nicklen, S. and Coulson, A.R. (1977) Proc. Natl. Acad. Sci. USA 74:5463-5467.
- Young, D.M. (1988) Microbiological sciences (in press).