

Abstract

The enzymatic activities of glucose-6-phosphate dehydrogenase (G6PDH), 6-phosphogluconate dehydrogenase (6PGDH) and transketolase (TK) were studied in cell-free extracts of normal red blood cells and malaria parasites. All preparations had activity. Starch gel electrophoretic staining patterns of the 3 enzymes G6PDH, 6PGDH and TK were detected in extracts of both rodent and human malaria parasites. It was possible to differentiate between all species of plasmodium parasites by the electrophoretic pattern of these 3 enzymes. The presence of phosphopentose isomerase and phosphopentose epimerase were indirectly demonstrated by the transketolase assay via cysteine- H_2SO_4 reaction and transketolase activity stain using as sole substrate ribose-5-phosphate or xylulose-5-phosphate. The data presented clearly indicate that the enzymes were of parasite origin. Our results combined with the evidence suggesting the existence of 6-phosphogluconolactonase in *P. berghei* support the conclusion that the malaria parasite has an active pentose phosphate pathway.

P. berghei transketolase from a crude preparation was studied for so far physico-chemical properties. The enzyme was rather stable when kept at -20°C rather than at 4°C and the loss of enzyme activity when stored at 4°C was partially due to proteases. The molecular weight determined by a Sephadex G-200 column was about 165,000 for the native protein. The apparent K_m 's for ribose-5-phosphate (R-5-P), xylulose-5-phosphate (X-5-P) and thiamine pyrophosphate (TPP) were $250\ \mu\text{M}$, $80\ \mu\text{M}$ and $4\ \mu\text{M}$, respectively. The isoelectric point of *P. berghei* transketolase was about 7.0 and the pH optimum was around 7.6. The activation energy for the

formation of sedoheptulose-7-phosphate (S7P) from X-5-P and R-5-P was estimated from rate measurements to be 7.3 Kcal/mole in the temperature range from 5°C to 60°C. The enzyme could be resolved into the apoenzyme and thiamine pyrophosphate in an acidic medium

The purification of *P. berghei* transketolase was achieved by using 2 columns, DEAE cellulose followed by chromatofocusing column, resulting in a single band of M_r about 63 Kd as analyzed by SDS-PAGE. The enzyme possibly exists as a dimer with identical subunits.

BIOGRAPHY

Name: PETCHPORN SRESTHAOLARN

Date of Birth: April 21, 1960

Place of Birth: Bangkok, Thailand

Institution Attended:

Secret Heart Convent, Bangkok

March, 1976

Certificate of Mathayom Suksa III

Strividhya II School, Bangkok

March, 1978

Certificate of Mathayom Suksa V

Mahidol University, Faculty of Medical Technology, Bangkok

March, 1982

Bachelor of Science (B.Sc. in Med. Tech.)