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| **Thesis Title** | Cloning of Serine Hydroxymethyltransferase (SHMT) from *Plasmodium falciparum* and *Plasmodium chabaudi* |
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## Abstract

The gene of serine hydroxymethyltransferase (SHMT) is studied in parasites since the SHMT is an important enzyme in *Plasmodium* metabolism. In order to clone SHMT gene from *P.falciparum* and *P.chabaudi*, polymerase chain reaction (PCR) technique has been used,employing degenerate primers. The degenerate PCR primers used in the reaction were designed and synthesized based on the highly conserved of amino acid sequences of SHMT from *E.coli*, rabbit liver cytosol and rabbit liver mitochondria.

Three parts of the SHMT gene, about 500,400 and 900 bp in length were amplified by PCR technique but only the 500 bp PCR product could be found in both parasites. After both PCR products were cloned into pBluescript $SK^+$ vector and sequenced by double strand sequencing method, their nucleotide sequences showed 516 bp and had high sequence identity with each other (about 80 %) and with the corresponding nucleotide sequences from *glyA* gene of *E.coli* (about 65 %), *Salmonella typhimurium* (about 60 %) and *Bradyrhizobium*

*japonicum* (about 54 %). In addition,the 500 bp mice PCR product could be found in the mouse DNA, and due to the host DNA contamination in *P.chabaudi* DNA, the product was also found in *P.chabaudi* DNA. The nucleotide sequence of mouse PCR product contained 540 bp and showed sequence identity with the 2 parasite sequences (about 49 %) and the 3 bacterial sequences (about 44 %).

Moreover, the amino acid sequences proposed from 3 sources of PCR products were compared with one another and with the deduced amino acid sequences from the 3 bacterial *glyA* genes and from the rabbit liver cytosol and rabbit liver mitochondria. The two parasite sequences showed high sequence identity with one another (about 90 %) and with the three bacterial SHMT sequences (about 65 %). However, they both showed less sequence identity with mouse sequence (about 38 %) and with the two rabbit liver isoenzyme sequences (about 47 %). The mouse sequence had higher sequence identity with the two rabbit liver sequences (about 53 %) than the three bacterial sequences (about 40 %). All of the similarity mentioned above showed that the PCR products from 2 parasites and mice may be a part of SHMT gene. The parasite SHMT genes were more similar with bacterial SHMT genes than the mammalian SHMT genes.