I. INTRODUCTION

The α-thalassemia is a hereditary hemolytic anemia characterized by decreased or absent synthesis of the α globin subunits of the hemoglobin molecule (Weatherall et al., 1981). In Thailand, there exists 15-30% α-thalassemia carriers distributed throughout the country, whereas 3-9% is β-thalassemia and 4% is hemoglobin Constant Spring(Bunn et al., 1977; Wasi et al., 1969).

Molecular analysis has shown that α-thalassemia is caused by a large variety of genetic defects. Most frequently, α-thalassemia results from extensive deletion due to recombination events including either one (-α or α-thalassemia 2) or both (-- or α-thalassemia 1) α genes from one chromosome (Higgs et al., 1989 ; Liebhaber et al., 1989), although with some mutations, the α genes are intact; these are referred to as the nondeletional types of α-thalassemia (Higgs et al., 1983).

The most severe form of α-thalassemia compatible with life is hemoglobin H disease, a condition characterized by anemia of variable severity, marked hypochromia and microcytosis, and the presence of hemoglobin H (Hb H). Generally, Hb H disease results from the interaction of α-thalassemia 1 and α-thalassemia 2, thus only one functional α globin gene is expressed ; --/-α. However, some patients with Hb H disease result from the interaction of nondeletional α-thalassemia with α-thalassemia 1 ; --/ $\alpha^T\alpha$ or the homozygous nondeletional α-thalassemia ; $\alpha^T\alpha/\alpha^T\alpha$. The objective of this study is to detect the molecular defects of Hb H disease in Northern Thailand.

Traditionally, Southern hybridization has been carried out with radioactively - labelled probe ; ^{32}P is the most commonly used

radionuclide. However, precautions must be taken when handling ^{32}P because of the radiation emitted. Detection by autoradiography, while sensitive, may take a long time if there are few counts in the hybrids. Furthermore, since ^{32}P has a short half-life of 14.3 days, experiments should be completed within one half-life, and finally it is inconvenient to discard the waste products. Thus, it is beneficial to introduce the non-radioactive Southern hybridization instead. The use of non-radioactive probes is becoming increasingly popular, especially biotin labelling of probes (Langer et al., 1981; Leary et al., 1983), because there are several advantages of using biotinylated probe. For example, non-toxic materials are employed and there are no problems of inconveniently short half-life of the label. This has the additional bonus that biotin labelled probes can be prepared in advance in bulk and stored at -20°C until required. Detection of hybrids is much faster than for the radioactive probes, visualization of hybrids being completed 2-4 h after washing. This method will be useful for clinical use in the determination of molecular defects of Hb H disease.

This data will be useful for the clinician to predict the severity of Hb H patients, and allow prenatal diagnosis in some cases. It is hoped that this study can also lead to genetic counselling and prevention in the future.