## INTRODUCTION AND AIM OF THE WORK

In most normal adults the major form of haemoglobin in red cells is haemoglobin A or $A_2$ (Cahill et al. 1976), which comprises more than 90% of the total haemoglobin concentration.Its subunit structue is $\alpha_2 B_2$.

The remaining 10% is made up of $HbA_{1c}$ (4-6%), $HbA_{1a}$ and $HbA_{1b}$ each comprising approximately 1-2% and possibly other minor components $HbA_{1a}$ and $HbA_{1c}$.

The minor hemoglobins can be separated from HbA and from one another by various chromatographic methods (Allen et al., 1958).

$HbA_{1c}$ is structarally identical to HbA, except for the presence of an additional negatively charged molecule the position of which is in the N-terminal end of B chain (Bookchin and Gallop, 1968).

Several investigators attempted to identify the substance responsible for the negative charge on the $HbA_{1c}$ molecule and in 1975, Bunn et al established that a glucose molecule was bound to the N-terminal valine residue by a schiff's base.

Whether glucose reacts directly with the $NH_2$ terminal valine, or an intermediate is involved, is at present unknown (Gonen and Rubenstein 1978).

so Haemoglobin $A_{1c}$ is the product of chemical condensation of HbA and glucose, reactants that are present in high concentration within the erythrocyte (Bunn et al., 1975).

Haney and Bunn (1976), demonstrated that $C^{14}$ glucose 6 phosphate binds to HbA in vitro at a much faster rate than does $C^{14}$-glucose, suggesting that glucose 6 phosphate may be an obligatory intermediate in the formation of $HbA_{1c}$.

The formation of $HbA_{1c}$ in vivo was determiend in two individuals who were given an infusion of $Fe^{59}$ labelled transferrin, the specific activity of HbA rose to a maximum during the first week and remained nearly constant in contrast, the specific activity of $HbA_{1c}$ and also $HbA_{1c}$ and also $HbA_{1b}$, $HbA_{1a}$ rose slowly reaching that of HbA by about day 60. The result indicate that $HbA_{1c}$ is slowly formed during the 120 day life spane of erythrocytes (Bunn et al., 1976).

It is of interest that glycosylation of Hb S to form $HbS_{1c}$ may occur in the circulation (Haney and Bunn 1976), hence the possibility of reducing sickling by glycosylation of Hb S has been raised, but this idea has not yet tested (Gonen and Rubenstein 1978).

$HbA_{1c}$ levels were elevated in infants with cystic fibrosis, who had low insulin reserve but normal glucose tolerance tests (Paulsen and Koury 1976).

$HbA_{1c}$ levels were low in conditions where there is a shortened life spane of erythrocyte (Bunn et al., 1976).

In diseases in which abnormal haemoglobine exist (e.g. thalassaemia), the levels of $HbA_{1c}$ are high with the methods of assay presently in common use (Wright and Northam 1982).

Increased levels of $HbA_{1c}$ hve also been reported in uraemic patients who under going chronic haemodialysis (Tesio et al., 1982).

It is not clear whether this is the outcome of haemoglobin carbamylation resulting from condensation of urea with the N-terminal amino groups (Fluckiger

et al., 1981), or due to some other impairment of ureamia e.g. acidosis (Tesio et al., 1982).

It is therefore our aim to study the levels of glycosylated haemoglobin in conditions of anaemia due to various etiological and pathological entities.

Iron deficiency whether nutritional, increaed demand or increased iron loss will form one group for study.

Another type of anaemia resulting from shortened life spane, belonging to the thalassaemia or to enzyme deficiency and immune mechanisms will form a second group.

A third one will comprise the hypoplastic or aplastic type of anaemia.