Has Haemoglobin a Future?

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Just over 25 years ago, Hermann Lehmann, in an uncharacteristically weak moment, told the author that haemoglobin was no field for a young research worker as there wasn't much left to do! Since then the structure, function, molecular genetics, molecular pathology and population genetics of the haemoglobin disorders have been worked out in detail. Indeed, haemoglobin has become the model for understanding all human single gene disorders at the molecular level. Thus, in 1986, in honouring Hermann Lehmann, it might well be asked whether there is anything left to do.

In this introduction to this symposium the important areas in the haemoglobin field which future research might be concentrated will be defined. Despite the detailed molecular information that is available the lot of patients with the major haemoglobinopathies has changed little. Perhaps the major advance has been in prenatal diagnosis but considerable difficulties remain in translating what is available in the research laboratory into the large rural populations of the Third World in which thalas-

saemia and sickle cell anaemia are producing an increasing public health problem. Although there are still considerable conceptual difficulties, it still seems likely that these conditions will be prime targets for the introduction of gene therapy over the next few years.

As well as these more immediate clinical problems, the haemoglobin loci still have important implications for the basic biological sciences.

Very little is known about the developmental genetics of human haemoglobin which offers an extremely tantalising model for working out how genes are switched on and off during human maturation. Similarly, detailed structural analysis of the globin gene loci and their mutations over the last few years has provided a completely new approach to working out the population genetics of common single gene disorders at the molecular level and, incidentally, of studying the evolution of human populations. In this sense the field has come a complete circle, since it was this particular aspect which first interested Hermann Lehmann in the whole problem of haemoglobin.