hypogammaglobulinaemia (Miller, 1968), and a connexion between autoimmune and malignant disease (Lea, 1964) supports this hypothesis.

γ G-globulin, the most specialized of the immunoglobulin classes, comprises four subclasses which differ antigenically and in biological function. It is possible that patients with either autoimmune disease or certain types of cancer may have characteristic and recognizable patterns of γ G-globulin heterogeneity. This communication reports an initial survey of 'heterogeneity patterns', which may result from (a) variations in subclass proportions, (b) aggregation phenomena, (c) differences of molecular configuration and (d) the Gm and Inv antigens. Catabolic experiments carried out in healthy individuals suggest that the rate of γ G-globulin elimination is reproducible and characteristic of the individual. The non-linear elimination curves can be largely explained as the resultant breakdown of different proportions of γ G₁ and γ G₂ molecules, but differences in configuration within the subclasses modify these patterns. Configurational abnormalities were also demonstrated by the unique electrophoretic patterns obtained from papain hydrolysates of γ G-globulins isolated from the sera of rheumatoid patients. The γ G-globulins of healthy individuals and of melanoma and myeloma patients did not show these patterns (Watkins, Unger & Mahon, 1970). There is evidence that the hinge region of the molecule is involved in these configurational differences.

The Gm antigens of 25 healthy individuals and of 14 rheumatoid and 39 melanoma patients described the most frequently occurring phenotypes in the U.K. In contrast there was an increased incidence of the Inv factors 1, 2 in the melanoma group (9/39) compared with the rheumatoid (1/14) and control (1/25) groups. The numbers are too small for real significance, but the incidence might be indicative of a specific genetic trait in individuals with melanoma.

These investigations are being extended.

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Extraction of Polymeric Collagen from Human Skin

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The polymeric collagen fraction of tissues has been isolated by the α -amylase (Steven, 1964), EDTA (Steven, 1967) and lyotropic-relaxation (Veis, Bhatnagar, Shuttleworth & Mussell, 1970) methods. These three methods have been compared by Veis *et al.* (1970) using bovine corium. However, Veis *et al.* (1970) concentrated on the preparation of a unit-fibril fraction and departed, in important respects, from the methods of Steven (1964, 1967). We describe the isolation of polymeric collagen fractions from 50 mm² samples of human skin, a size that could reasonably be obtained by biopsy, by modifications of these methods and the comparison of the properties of the polymeric collagen fractions.

Contiguous human skin samples (30–150 mg wet wt.), obtained *post mortem*, were extracted successively with 5% (w/v) NaCl, 0.2M-sodium phosphate buffer, pH 5.4, and water, and incubated at 18°C with either crude *Bacillus subtilis* α -amylase (Steven, 1964), EDTA (Steven, 1967) or water (Veis *et al.* 1970). The insoluble residues were washed exhaustively with water, homogenized in 100 ml of 0.2M-acetic acid for 10 s with an Ultra-Turrax disintegrator and the suspension was centrifuged at 300g for 10 min; the resulting residues were re-extracted with a further 100 ml of 0.2M-acetic acid and similarly centrifuged. The polymeric collagen in the combined acetic acid supernatants was isolated as a fibrous mass by adding 1.0M-NaOH to pH 6.0–7.0 and washed repeatedly with water; 3.0–20 mg of polymeric collagen was obtained, sufficient for chemical investigation by the methods of Steven (1966) and for electron microscopy.

The yields of polymeric collagen from six samples were 40–90% of the total collagen but did not depend on the method of extraction. The three methods gave polymeric collagen fractions with similar chemical stabilities, though the samples prepared after α -amylase treatment differed on electron microscopy from those prepared after aqueous treatment.

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