

CHANGES OF IMMUNOGLOBULIN SYNTHESIS IN OLD PEOPLE

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PATHOLOGICAL proteins, formerly described as paraproteins, M-components, etc., were till recently considered practically exclusively as a symptom of myeloma and Waldenström's macroglobulinaemia. However, convincing evidence was provided that they occur much more frequently also in other diseases and in healthy subjects (Axelsson *et al.*, 1966; Derycke *et al.*, 1965; Haferkamp *et al.*, 1966; Hällén, 1966).

In the normal population the incidence of pathological proteins rises distinctly with age and usually we find in these subjects pathological proteins in low concentrations—in 97 per cent less than 1g/100 ml and most frequently the lowest detectable concentrations of about 0.3 g/100 ml were recorded (Hällén, 1966).

We tried to assess whether the incidence increases also in very old subjects in the ninth decade and whether, when more sensitive methods are used, pathological proteins can be detected in lower concentrations than 0.3 g/100 ml.

MATERIAL AND METHODS

A total of 446 subjects were examined. (a) 369 subjects aged 65-79 yr, (b) 51 subjects aged 80-89 yr. The subjects of both groups were in the course of one year hospitalized on account of various conditions with the exception of myeloma and Waldenström's macroglobulinaemia. (c) 26 subjects aged 90-99 yr from an old age pensioners' home, who suffered only changes common in advanced age (arthroses, atherosclerosis, mental disorders, etc.).

Agarophoresis was performed in the usual way in 1.5 per cent agar gel, 5 μ l of serum was transferred into a circular opening, the separation took place at 5 V/cm without cooling, or in the modification by Popadiuk (1961): into the canal in agar gel 10 μ l serum are transferred and separated at 20 V/cm under cooling.

The sensitivity of both methods for detection of homogeneous gradients was assessed by the migration of albumin towards γ G immunoglobulin. During common agarophoresis it is possible to assess by this method reliably a homogeneous albumin gradient at a concentration of 0.3 g albumin/100 ml, by agarophoresis in Popadiuk's modification still at a concentration of 0.1 albumin/100 ml.

RESULTS

In the group of 369 subjects aged 65-79 yr, using common agarophoresis, we detected an atypical gradient of a pathological protein in six subjects, i.e. in 1.6 per cent. In the group of 51 subjects aged 80-89 yr we recorded, using common agarophoresis, an atypical gradient in four subjects, i.e. in 7.8 per cent and when using the more sensitive

TABLE 1

Author	Axelsson <i>et al.</i>	Our results	
Sensitivity of method	0.3 g/100 ml	0.3 g/100 ml	0.1 g/100 ml
Incidence of pathological proteins in age groups			
65-79	1.9%	1.6%	—
80-89	5.7%	7.8%	11.7%
90-99	—	—	19%

method described by Popadiuk in 11.7 per cent, i.e. in a total of six subjects. In the group of subjects aged 90-99 yr we used only Popadiuk's modification and an atypical gradient was found in five subjects, i.e. in 19 per cent (Table 1).

DISCUSSION

If we compare our results with those of Axelsson *et al.* (1966) (Table 1), it is obvious that when equally sensitive methods are used, the results in the same age groups are very similar. There are, however, marked differences when more sensitive methods are used. From our results it is apparent that the relationship between the incidence of pathological proteins and age applies also in the tenth decade.

We assume that the detected atypical gradients in the sphere of electrophoretic migration of immunoglobulins are a manifestation of enhanced monoclonal antibody synthesis (Waldenström, 1964). These changes of immunoglobulin synthesis in advanced age may contribute to the explanation of the fact that immunoglobulins increase with age, while the total serum antibody activity declines (Haferkamp *et al.*, 1966).

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Summary — In 446 subjects aged 65-99 yr 17 times the presence of an atypical gradient in the sphere of immunoglobulin migration was detected. The findings are discussed in relation to the immunoglobulin concentration and their antibody activity in old people.

Résumé — Chez 446 sujets âgés de 65 à 99 ans la présence d'un gradient atypique dans la sphère de la migration d'immunoglobuline a été détectée 17 fois. Les résultats sont discutés du point de vue concentration d'immunoglobulines et de leur activité anticorps chez les vieillards.

Zusammenfassung—Bei 446 Personen im Alter von 66-69 Jahren wurde 17 mal ein atypischer Gradient im Bereich der Immunglobulinwanderung festgestellt. Die Befunde werden hinsichtlich der Immunglobulinkonzentration und ihrer Antikörperaktivität bei alten Leuten diskutiert.

Резюме—у 446 лиц в возрасте 65-99 лет 17 раз обнаружилось присутствие нетипичного градиента при миграции иммуноглобулинов. Эти данные обсуждаются с точки зрения их отношения к концентрации иммуноглобулинов и их активности в качестве антител у старых людей.