DR. D. C. DUMONDE (*Kennedy Institute*) Working with foreign species, globulin as antigen is something of a hazard for the experimental immunologist, because it may contain natural antibodies to certain mammalian tissue antigens. The question arises whether the results obtained with one such globulin antigen in various strains of mice are of general applicability.

DR. WHALEY I did mention this as a possibility. We have attempted to exclude this possibility by looking for natural antibodies and sucrose density gradient studies to see whether immune complex formation occurred. Furthermore, the more rapid rates of BSA and PVP catabolism in New Zealand mice suggest that natural immunity is not an important factor.

Studies on Synovial Fluid Lymphocytes in Rheumatoid Arthritis. By P. J. SHELDON, M. PAPAMICHAIL, and E. J. HOLBOROW (*M.R.C. Rheumatism Unit, Canadian Red Cross Memorial Hospital, Taplow, Maidenhead, Berkshire*) *Annals*, **33**, 509.

Heterogeneity of Human Synovial Tissue Cultures. By J. M. MARSH*, S. SPENCER, O. WIEBKIN, R. N. MAINI, D. C. DUMONDE, and H. MUIR. (*The Kennedy Institute of Rheumatology, London*).

Monolayer cultures from synovial explants have been reported to possess at least three morphologically distinct cell types: spindle, stellate, and multinucleate giant cells (Bartfeld, 1965; Smith and Hamerman, 1969; Smith, 1971; Castor and Dorstewitz, 1966). We report the characterization of the cell populations which are present in primary and long-term monolayer cultures by using phase contrast microscopy, a cell size analyser, and Ficoll density gradients.

Synovial tissue for culture was obtained during surgery, arthroscopy, or autopsy from twenty-five normal and thirty-seven rheumatoid joints; and for comparative purposes, twelve lines of skin fibroblasts were derived from skin excised at time of abdominal surgery. When cell growth from the explants became confluent, subcultures were obtained by disaggregating with trypsin and EDTA. All cultures were monitored for the presence of contaminating Mycoplasmas.

The morphology of cells using phase-contrast microscopy was studied in all cell cultures during the primary stage and an analysis of differences between normal and rheumatoid cultures is documented, and in general agrees with the findings of other workers.

Characteristic	*Normal*	*Rheumatoid*
Cell type	Spindle, stellate	Spindle, stellate
Nucleoli	Present	Increased
Nuclear budding	Occasional	Frequent
Multinucleate cells	Less common	Common
Particulate debris	Little	Increased
Contact inhibition	Present	Increased
	Overcome by 15–20% FCS	Overcome by 30% FCS
Cell proliferation rate		
0–72 hrs	No growth visible	Marked explant growth
1–2 wks	Slow	Rapid
2–6 wks	Rapid	Slow

Secondary cultures (subcultures) were studied in nineteen lines of normal synovial tissue, seven of which were maintained up to 300 days in culture or fourteen passages. Twenty secondary rheumatoid cell lines were studied until the third to eighth passage. Only one rheumatoid cell line was maintained in continuous culture for 270 days. Normal synovial subcultures retained a more rapid population doubling time in comparison to the rheumatoid cell lines. After repeated passages, all cultures exhibited a tendency to become more homogeneous.

Using a cell size analyser, measurement of cell volumes during the first and second subcultures showed a non-sigmoid distribution indicating the presence of different cell populations. The results of measurements made on fifteen normal and four rheumatoid synovial cultures (at subculture 2) were analysed for their distribution by cell volume. Two or three distinct populations could be distinguished and their frequency in rheumatoid and normal cultures was determined. Preliminary results suggest that rheumatoid cultures have a preponderance of larger cells.

Ficoll gradients were used to separate the synovial cultures into at least two distinct populations. Changes in cell distribution on the density gradients after four or five passages have been observed in normal synovial cultures and may be ascribable to an ageing process.

The technique provides a basis for studying the behaviour of synovial cells *in vitro* and may be employed as an approach to the investigation of differences between rheumatoid and normal cells.

* Canadian Arthritis and Rheumatism Society Research Fellow.

References

Bartfeld, H. (1965) *Ann. rheum. Dis.*, **24**, 31
Castor, C. W., and Dorstewitz, E. L. (1966) *J. Lab. clin. Med.*, **68**, 300
Smith, C. A. (1971) *J. Exp. Med.*, **134**, 306
Smith, C., and Hamerman, D. (1969) *Arthr. and Rheum.*, **12**, 639

Note

Revista Española de Reumatología

It is a pleasure to note the appearance of a new European journal on rheumatology—*Revista Española de Reumatología*. This is to be the official organ of the Spanish Society for Rheumatology, and takes the place of the previous *Revista Española de Reumatismo y Enfermedades Osteoarticulares*.

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