single allelic disparity caused observable differences in the sibling data; quantitative disparity increased when two allelic differences were compared with one. Kinetic measurements indicated a minimal “responding unit” of 1 per 300 cells, a “dividing unit” of 1 per 200 cells, and a cell generation time of 18 hours. Reasons for high frequency of “responding units” in cellular immune reactions and the mechanism for recognition were discussed.

The second speaker, Eli Sercarz (University of California, Los Angeles) elaborated on in vitro experiments that were directed toward substantiating his previously formulated X-Y-Z scheme of maturation of immunocompetent cells. Briefly, this scheme involves an X cell or antigen-sensitive lymphocytic cell which, upon antigen stimulation, is converted to a Y or “memory” cell; the latter, triggered by antigen, divides and matures irreversibly to a Z or terminal cell that is a mature, antibody-producing plasma cell. Using a constant in vivo dose of 10 mg of bovine serum albumin per rabbit and exposing spleen tissue in vitro to varying levels of antigen, different levels of unresponsiveness were obtained. While the data established the existence of a reversible state of in vitro paralysis, the cell stage at which paralysis occurs remains unknown. The time for establishment of memory in the primary response was less than 1 day. During this time, no cell division was required, but during the first day of the secondary response progenitor cells divided. It was concluded that it may be possible to study directly the antigen-binding activity of memory cells by sensitive techniques of micromanipulation, specific enzyme-binding antibody, and fluorimetry.

Robert Good (University of Minnesota, Minneapolis) chaired the session on “Cell Population Qualities and Kinetics in the Immune Response.” Edward Boyse (Sloan-Kettering Institute for Cancer Research) spoke on “Antigenic Differentiation of Lymphoid Cells” and primarily about his own investigations. This work deals with normally occurring surface antigens, involving genetic differences among cells of the same type (for example, thymocytes) from different individuals, or phenotypic differences among the cells of a single individual. Whereas the genetic differences are of practical significance in homotransplantation, the phenotypic differences are of special interest because they are presumably relevant to the organization of interdependent cell populations within an individual. Six antigen systems have been defined for mouse thymocytes, using cytotoxic antisera in an in vitro test. The cell surfaces have been mapped on the principle that when antibody is absorbed by one of two cell antigens of different specificity, both situated in close proximity on the cell surface, the subsequent absorption of antibody by the other antigen is impeded. All the antigens studied occur on both thymocytes and lymphocytes with the exception of one set, TL, that is present only on thymocytes. Normally the antigens are stronger on thymocytes than on lymphocytes except H-2 which has four times as much on lymphocytes as on thymocytes. The genes for H-2 and TL are linked; the others are independent in inheritance. The TL genes (Tla) are unexpressed in TL mice, but may be activated during leukogenesis. Leukemia cells taken from immunized animals do not express TL antigen, but the cells regain the antigen upon passage in nonimmunized syngeneic hosts, a phenomenon termed...
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...antigenic modulation. The features of antigenic modulation were amplified. It is assumed, but not established, that the cluster pattern of the antigens is a basic repetitive unit on the cell membrane.

Takashi Makinoda (Oak Ridge National Laboratories) spoke about "Kinetics of Cell Populations" and described various models of cell multiplication that might account for the exponential increase in numbers of antibody-forming cells. The experimental system of this investigator involves spleen tissue from mice stimulated with sheep red blood cells. Although the rate of cell increase is actually dependent upon antigen dose and factors such as cell migration, death, and possibly dedifferentiation, the models were simple and did not involve the latter parameters. The models differed with respect to number of recruitments (single or multiple); manner of recruitment (random or non-random); and proliferative capacity of the recruited cells (no division; synchronous or asynchronous division).

The data from Perkins and other collaborators at Oak Ridge were most compatible with the model characterized as non-random, multiple recruitment, proliferating synchronously. Recruitment of cells capable of dividing would characterize a highly efficient differentiation process in which only a limited number of programmed cells need be stored at any one time.

The concluding session on "Regulation of the Immune Response" was chaired by Edwin Lennox (Salk Institute, San Diego). Coinvestigators Donald Rowley and Frank Fitch (University of Chicago) spoke on "Feedback Regulation." Model systems where regulation has been achieved were presented and factors involved were discussed from the findings. One model makes use of renal allografts in rats, and was studied for the effect of administering donor lymphoid cells from spleen or kidney (antigen) and/or antibody intravenously at various times with respect to time of the surgery. When both antigen and antibody were administered one day prior to surgery, the grafted kidneys function optimally, over very prolonged periods. Despite kidney survival, the treatment of the host had no effect on survival of skin grafts. Some circulating antibody against donor antigen was detected, even while the kidney grafts were fully functional. Since circulating antibody had not been totally suppressed, the...
inhibition of response had been primarily in the delayed hypersensitivity system. When the established kidney was removed, without further treatment of the host, a successful second renal allograft could be achieved. Thus, it appeared that treatment with antigen and antibody had modified host rather than effecting a change in graft. From a second in vivo model involving Sprague-Dawley rats sensitized with sheep red blood cells and Freund’s adjuvant specific antibody reduced the delayed hypersensitivity response when antigen was given 9 days later. It was postulated that delayed hypersensitivity involves two interactions between cells of limited number and that one of these (non-macrophage) had been suppressed by antibody. It had been shown previously by an in vitro model (plaque assay) that Sprague-Dawley rats, treated with specific antibody prior to sensitization with $10^8$ sheep red blood cells, had a greatly reduced number of plaques in the spleen. The number represented a negligible response compared to well characterized responses to sheep red blood cells over a wide dosage range. It was suggested that, because of the importance of giving antibody before antigen, antibody acts by combining with antigen (at the level of specific antigenic determinants) and its effect is independent of adjuvant effect. Cell interaction appears to be important in both in vivo and in vitro reactions, as evidenced by the fact that the “rocking” of dispersed cells in cultures produced an increased number of plaques. The mechanism for feedback regulation by antibody was suggested as prevention of cell interaction through combination with antigen.

Eugene Lance (Cornell University) gave the concluding speech on “Immunosuppression.” Nonspecific immunosuppressive agents (those whose action is not unique to the immune system or to particular antibody responses) include x-irradiation, radioimmunometric drugs, steroids, and antiglobulins (all acting on processes of cell division, cell viability, and components of the DNA–RNA–protein sequence). Some uncertain miscellaneous phenomena such as thet injecting a macrophage and a lymphocyte serum (ALS) were taken up in some detail. ALS, serum obtained by injecting lymphocytes into another species (the antibody fraction eluted after absorption of such

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serum to lymphocytes), alters immune reactions profoundly. Some points in describing the scope of the effect of ALS on humoral response were: importance of giving ALS before antigen (optimal effect when given intravenously 3 days before antigen), effectiveness on primary response which is suppressed but not abolished, and non-effectiveness against the secondary response. In order to prolong skin graft survival indefinitely, ALS must be given continuously. The serum caused no change in the thymus but produced selective damage in the paracortical area of thymus-dependent lymphoid tissue (spleen and bone marrow). The fate of labeled ALS-eluted antibody was studied. Because of rapid blood clearance it was assumed to exert a rapid effect. Radioautography of various tissues indicated only a small percentage uptake into lymphoid tissues. Because of large uptake in liver, a model was presented that indicated interaction of recirculating lymphocytes with circulating ALS and clearance of these cells by the liver. Lance expressed concern about the tendency of immunosuppressive drugs and ALS to increase the background of neoplastic cells that might give rise to lymphomas. However, he was optimistic about deriving experimental models using skin grafts and limited amounts of ALS plus other immunosuppressive agents that would lead to avoiding untoward clinical reactions to grafts.

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JUSTINE S. GARVEY
Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena 91109

National Meetings

August

3-6, National Heat Transfer Conf., 11th, Minneapolis, Minn. (D. C. Kelly, American Inst. of Chemical Engineers, 345 E. 47 St., New York 10017)

3-7, Society for Cryobiology, 6th annual, Buffalo, N.Y. (R. E. Greco, 3175 Staley Rd., Grand Island, N.Y. 14072)

4-5, Aerospace Structures Design Conf., Seattle, Wash. (J. R. Fuller, Boeing Co., P.O. Box 707, Orgn. 8-8650, M/S 77-89, Renton, Wash. 98055)

4-5, American Soc. of Safety Engineers, College Park, Md. (W. C. Christensen, ASSE, 850 Busse Highway, Park Ridge, Ill. 60068)

4-6, Deterioration and Preservation of Library Materials, 34th annual conf., Chicago, Ill. (H. W. Winger, Graduate Library School, Univ. of Chicago, 1116 E. 59 St., Chicago 60637)

4-8, Molecular Biology and Pathology, 2nd conf., Saratoga Springs, N.Y. (K. T. Lee, Dept. of Pathology, Albany Medical College, Albany, N.Y. 12208)

5-8, World Conf. on Records, Salt Lake City, Utah. (S. E. Beesley, 1030 S. Orchard Dr., Bountiful, Utah 84010)

6-8, Applications of X-Ray Analysis Conf., Denver, Colo. (B. L. Henke, Div. of Metallurgy, Denver Research Inst., Denver 80210)

10-13, Soil Conservation Soc. of America, Fort Collins, Colo. (H. W. Pritchard, 7515 NE Ankeny Rd., Ankeny, Iowa 50021)


11-14, Society of Photo-Optical Instrumentation Engineers, 14th annual technical symp., San Francisco, Calif. (H. L. Kasnitz, SPIE Symposium, P.O. Box 288, Redondo Beach, Calif. 90277)

12, American Astronomical Soc., Albany, N.Y. (G. C. McVittie, Univ. of Illinois Observatory, Urbana 61801)

13-24, Frontier Topics in Crystallography, Stony Brook, L.I., N.Y. (E. H. Kone, American Inst. of Physics, 335 E. 45 St., New York 10017)


17-22, American Soc. of Zoologists, Burlington, Vt. (J. R. Shaver, Dept. of Zoology, Michigan State Univ., East Lansing 48823)

18-20, Genetics Soc. of America, Madison, Wis. (B. Wallace, Dept. of Genetics, Cornell Univ., Ithaca, N.Y. 14850)

18-21, American Hospital Assoc., Chicago, Ill. (E. L. Crosby, 840 N. Lake Shore Dr., Chicago 60611)

18-22, New England Assoc. of Chemistry Teachers, 31st summer conf., Plymouth, N.H. (M. P. Olmsted, Publicity Chairman, NEACT, 9 Brookmont Dr., Wilbraham, Mass. 01095)

18-22, American Soc. of Pharmacology, 10th annual, Corvallis, Ore., with Marine Biomed'cinals Symp. (P. Catal-forno, School of Pharmacy, Oregon State Univ., Corvallis 97331)

18-22, American Phytopathological Soc., Spokane, Wash. (J. P. Fulton, Dept of Plant Pathology, Univ. of Arkansas, Fayetteville, 72701)

18-22, National Goals in Water Pollution Control, Santa Barbara, Calif. (F. A. Butrico, Coordinator of Environmental Sciences Programs, Battelle Memorial Inst., Columbus Laboratories, Washington, D.C. 20008)

19, Biometric Soc., western North American regional, Pullman, Wash. (J. S. Williams, Statistical Lab., Colorado State Univ., Fort Collins)

19-21, Birch Symp., Durham, N.H.
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19-22. American Assoc. of Clinical Chemists, 21st nat'l mtg., Denver, Colo. (J. Preston, P.O. Box 18323, Capitol Hill Station, Denver 80218)


19-22. Phytochemical Soc. of North America, Banff, Alberta, Canada. (J. W. Watkin, Prairie Regional Lab., Saskatoon, Sask., Canada)


19-23. American Fern Soc., Seattle, Wash. (A. M. Evans, Dept. of Botany, Univ. of Tennessee, Knoxville 37916)


24-25. Programming Languages Definition, San Francisco, Calif. (J. A. Painter, IBM Corp., Research Lab., Dept. 978, Bldg. 025, Monterey and Cottle Rds., San Jose, Calif. 95114)


24-27. Conference on Food-Drugs from the Sea, Kingston, R.I. (G. F. Greene, Jr., % Professional Services, Abbott Labs., North Chicago, Ill. 60064)


24-2: Botanical Soc. of America, Seattle, Wash. (R. C. Starr, Dept. of Botany, Indiana Univ., Bloomington 47401)


26-28. Engineering Applications of Electronic Phenomena Conf., Ithaca,
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Foreign Meetings

**September**

1–4. International Soc. of Geographical Pathology Conf., Jerusalem, Israel. (I. S. Levi, Dept. of Pathology, Hebrew Univ., Hadassah Medical School, P.O. Box 1172, Jerusalem)


1–5. International Soc. of Neurochemistry, 2nd, Milan, Italy. (R. Paoletti, Scientific Secretary, Inst. of Pharmacology, Univ. of Milan, via Andrea del Sarto 21, 20129 Milan)

1–5. Phenomena in Ionized Gases, 9th intern. conf., Bucharest, Rumania. (E. Badareu, Inst. of Physics, Acad. of Science, Bucharest, Rumania)


1–12. International Assoc. of Geomagnetism and Aeronomy, Madrid, Spain. (P. A. Romana, Observatoire del Ebro, Apto 9, Taratosa, Spain)


2–4. Hyperbaric Medicine, 4th intern. congr., Sapporo, Japan. (T. Iwa, Dept. of Thoracic and Cardiovascular Surgery, Sapporo Medical College and Hospital, So. 1, West 16, Sapporo 060)


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Circle No. 76 on Readers’ Service Card on page 110A
4-9. **Ferroelectricity**, 2nd intern. conf., Tokyo, Japan. (H. Takahashi, Faculty of Science, Univ. of Tokyo, 7 Hongo, Bunkyo-ku Tokyo, Japan)

5-10. International Clay Conf., Tokyo, Japan. (S. Iwao, Secretary General, Organizing Committee, The Conference, Science Council of Japan, Ueno Park, Tokyo 110)


7-14. International Symp. on **Unproven Methods of Cancer Diagnosis and Treatment**, São Paulo, Brazil. (A. C. C. Junqueira, % Hospital A.C. Camargo, P.O. Box 5217, São Paulo)

8-12. **Congenital Malformations**, 3rd intern. conf., The Hague, Netherlands. (Local Secretary, % Holland Organizing Centre, 16, Lange Voorhout, The Hague)

8-12. **Fiscal Assoc.**, 23rd intern. congr., Rotterdam, Netherlands. (Local Secretary, Holland Organizing Centre, 16, Lange Voorhout, The Hague, Netherlands)


8-12. International Assoc. of **Seismology and Physics of the Earth’s Interior**, Madrid, Spain. (J. P. Rothe, General Secretary, The Association, 38 Boulevard d’Anvers, 67 Strasbourg, France)

8-13. **Electrosleep and Electroanaesthesia**, 2nd intern. symp., Graz, Austria. (F. M. Wagener, Secretary, ISFE, Chirurgisch Universitätsklinik Graz, 8036 Graz)

9-12. International Symp. on **Conformational Analysis**, Brussels, Belgium. (R. C. Smekens, Executive Secretary, ISCA, 49, Square Marie-Louise, Brussels 4)


15-20. International Symp. on **Design and Application of Logical Systems**, Brussels, Belgium. (J. Florine, Laboratoire d’Electronique Industrielle, Université Libre de Bruxelles, 50, Avenue F. D. Roosevelt, Brussels, 5, Belgium)
edited by HUGH DAVSON, Physiology Department, University College, London, England.

In this completely revised edition of Vol. iv, the authors have taken the opportunity to make some essential changes in scope. The great advances in our knowledge of the chemistry of the retina have made a separate chapter necessary. The distinguished authors have made it possible to care for the subject to improve its own two chapters.


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(Continued from page 168)

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