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SEGREGATION OF G<sub>m</sub> ALLOTYPES  
AND  
IMMUNOGLOBULIN LEVELS

by

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a Thesis

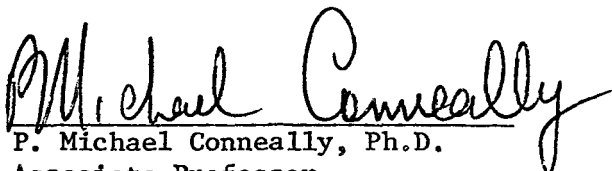
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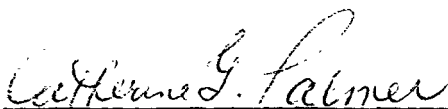
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Phytohemagglutinins (PHA) have been used to stimulate T and B lymphocytes in mixed cultures to synthesize IgG immunoglobulins (Rivat et al., 1973). Gm factors not present in the donors phenotypes were detected after 6, 8 or 9 days of incubation in autologous serum. Rivat et al. (1970) suggested that the genes controlling the synthesis of these allotypes are transmitted by one of the two donors but unexpressed in the donor phenotype. When the cells are cultured in the presence of PHA, the regulator gene or its products may be inactivated allowing the expression of other structural genes.

A second hypothesis proposed by the same author (Rivat et al., 1970b) is that the Gm allotypic genes are regulatory genes which control the expression of structural genes which are always present but can express themselves only in the presence of the appropriate regulatory genes. These regulatory genes controlling the synthesis of IgG1Gm(1) or IgGGm(3), as well as IgG2, IgG3, and IgG4, would be genetically transmitted from the parents to the children, and the Gm genes, as we know from family studies, would truly be the regulatory genes.

### Summary

Gm allotypes were determined in the serum of 460 members of 53 monozygotic twin-pair families. Gm factor, haplotype and genotype frequencies were calculated and found to agree with previous reports. Segregation analyses of matings in which fetal-maternal incompatibility occurred suggested no prezygotic selection or fetal wastage. Total levels of the IgG, IgA and IgM immunoglobulins were not related to the Gm phenotype. Segregating Gm haplotypes from Gm heterozygous monozygotic twin parents had no significant effect ( $P > .05$ ) on the immunoglobulin levels in their children. These results suggest that the regulatory factors are independent of the structural genes.

## TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
The Formation of the Immunoglobulins. . . . .	4
Structure of the Immunoglobulins. . . . .	5
The Gm Antigens and Their Inheritance . . . . .	11
Determination of Gm Allotypes by Inhibition of Hemagglutination . . . . .	22
Fetal-Maternal Gm Incompatibilities . . . . .	27
The Relation of Gm Antibodies to Blood Transfusions. . . . .	30
The Use of Gm Typing in Cases of Disputed Paternity. . . . .	31
Statement of Purpose of This Study. . . . .	33
 MATERIALS AND METHODS	
Half-Sib Families . . . . .	34
Gm Testing Reagents . . . . .	35
Gm Testing Procedure. . . . .	40
Statistical and Mathematical Methods. . . . .	45
 RESULTS	
General Statistics of the Half-Sib Family Population. . . . .	48
Haplotype and Genotype Frequencies. . . . .	50
Fetal-Maternal Gm Incompatibility Studies . . . . .	59
Immunoglobulin Values . . . . .	64
Effect of Segregating Allotypes on Immunoglobulin Levels . . . . .	73
DISCUSSION . . . . .	83
SUMMARY. . . . .	91
REFERENCES . . . . .	92
APPENDIX . . . . .	100
CURRICULUM VITAE . . . . .	106