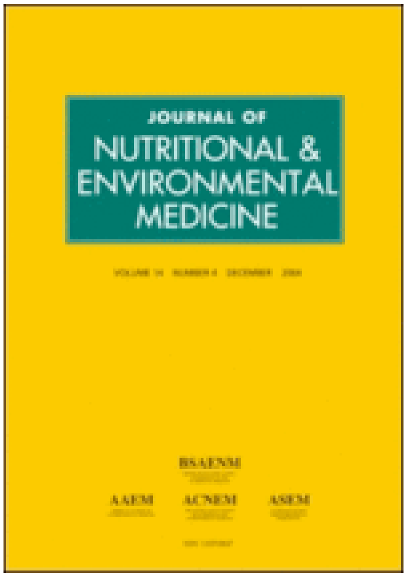

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Biotype Diets System®: Blood types and food allergies

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Abstract

Purpose: The goal of this research was to determine patterns in adverse food reactions among human biotypes, if any. **Design:** Blood types A1, A2, B, AB, O and Rh-negative were correlated to four kinds of food allergies and hypersensitivities. **Materials & Methods:** Three studies were conducted from 1985 to 2004. Blood types were correlated to food scores from: (1) mRAST-IgE food allergy tests, (2) mRAST-IgG food hypersensitivity tests, and (3) T-Cell food hypersensitivity tests (ELISA/ACT® LRA). An allergy history was recorded. Data was evaluated by statistical analyses, including: ANOVA, MANOVA, Mann-Whitney U, Kruskal-Wallis, and Chi Square. Clinical categories were established by means and ranges. (4) Blood-type specific lectins were included from the scientific literature. **Results:** Results were reported by blood types and food groups as raw scores and Classes, and included the following: Blood type A1 reacted most strongly to nuts and beans, eggs, dairy, and nightshades; while type A2 reacted to the same but more strongly to dairy, eggs and gluten grains. Type B reacted most to eggs, nuts and beans, dairy, gluten grains, nightshades, and sugars. Type O reacted most to dairy, eggs, gluten grains, and nightshades. Type AB reacted most to nuts and beans, seafood, eggs, and dairy; while A2B also reacted to gluten grains. Type Rh-negative was most reactive to eggs, dairy, nuts and beans, and gluten grains. The highest IgE scores were among types B and Rh-negative. The highest IgG scores were among types O, A2 and Rh-negative. The most lectins reacted with type AB. **Conclusions:** The research showed patterns in food group allergies and hypersensitivities based on ABO, A1/A2 and Rh blood types. Biotype Diets is the first diet-typing system supported by original scientific research, and has greater accuracy and specificity than other systems.

Keywords: **blood type; blood group; ABO; Rh; food allergy; food hypersensitivity; diet; biotype.**

1. Introduction

People have substantial differences in digestive capabilities, food intolerances, food allergies and hypersensitivities. Hence not all people can eat the same foods, and no diet system can suit all people equally well. Many food reactions are to the most common foods eaten, such as dairy products, eggs, gluten grains, soy, peanut and nightshades. The incidence of allergic diseases has tripled in industrialized nations in the last several decades, while food hypersensitivities are common but often go unrecognized, untested and untreated. Finally, immune reactions to foods can ultimately lead to inflammatory diseases and some autoimmune disorders, such as celiac disease and rheumatoid arthritis.

The goal of this research was to determine patterns in adverse food reactions among human biotypes, if any, and to develop a diet-typing system. Although several commercial systems exist, few if any are supported by scientific research. The Biotype Diets System is based on 20 years of research that statistically correlates blood types to four kinds of food allergies and hypersensitivities. Blood types were chosen as a biological marker because they are stable genetic markers, are clear, quick and inexpensive to identify, interact with the immune system, and have previously been correlated to aero allergies, allergic diseases, gastrointestinal diseases, and food lectins. ABO markers are also present on many allergy-sensitive tissues in the body (mucous membranes, digestive and respiratory tissues, skin, joints and organs). The four Gell-Coombs immune responses were chosen (IgE, IgG, T-cells, and lectins) because they relate directly to food allergies and hypersensitivities, testing is commercially available, and food lectins are reported in the scientific literature. Biotype diets is the first diet system to employ food allergies, food hypersensitivities, and blood subtypes A1/A2 and Rh-negative.

Benefits include both identification and treatment of probable food allergies and food hypersensitivities for specific biotypes. This has the potential to alleviate inflammatory and autoimmune diseases as well as improve optimal health.

2. Materials & methods

2.1 Study design

Three research studies were conducted over a twenty-year period from 1985 to 2004. These were descriptive cross-sectional correlational surveys that correlated blood types to three kinds of food allergies and hypersensitivities by statistical analysis. Records were obtained from The Allergy & Nutrition Clinic in Falls Church, Virginia and from The Nutrition Clinic in Bethesda, Maryland. Otherwise healthy patients were self-referred for nutrition or food allergy counseling. Of these the first 500 were selected. In addition the literature was reviewed to determine blood-type specific lectins in foods.

Six blood types were selected as independent variables: A1, A2, B, O, AB, and Rh-negative. Each subject was tested by finger prick for blood type using reagents from Carolina Biological Supply Co. Each subject signed a consent form for the study. The original pilot study (100 IgE and IgG) was approved by the University of Maryland Human Subjects Committee.

2.2 Demographic data

Statistical analysis for health and demographic data was compiled in the following manner: Blood types, gender and ethnic background distributions were compared to U.S.A. distributions by chi-square analysis. Age, pulse, blood pressure, and body mass index were compared to U.S.A. population means by student's t-test. Distribution of factors between blood types was analyzed by contingency table analysis (all by Statview on Macintosh.) Results showed some statistically-significant deviations from the national norms: more rare blood types (A2, AB, B, Rh-), more females than males, an older population, lower blood pressure, and higher body mass index.

Table 1. Number of Subjects In 3 Studies

FACTORS	IgE STUDY	IgG STUDY	T-CELL STUDY	TOTAL SUBJECTS	ALLERGY HISTORY
Blood Type A1	40	40	44	**124**	30
Blood Type A2	30	30	17	**77**	5
Blood Type B	30	30	20	**80**	10
Blood Type O	60	60	56	**176**	50
Blood Type AB	15	15	13	**43**	5
Blood Type Rh+	144	144	113	**401**	81
Blood Type Rh-	31	31	37	**99**	19
All Subjects	**175**	**175**	**150**	**500**	**100**

2.3 IgE methods

Method: IgE immediate food allergies were determined by Modified RAST (Fadal-Nalebuff Radio Allergosorbent Test). Tests were performed by Commonwealth Medical Laboratories of Virginia, USA, a CLIA certified laboratory (Clinical Laboratory Improvement Act). IgE antibodies to 34 foods were measured on 175 subjects for a total of 5950 food test scores. **Means:** Mean scores for nine food groups were calculated for each subject by averaging similar foods. Then subjects were grouped by blood type, and the grand means calculated for each blood type (with standard error). **p-Value:** mRAST scores are continuous data, and when correlated to blood type categories, p-values would normally be analyzed by ANOVA. However, most allergy test scores lack bivariate normal distribution; and Bartlett's test also showed non-homogeneous data (before log conversion). So p-values were determined by modified ANOVA on the means of the food groups as the Log (x+1). Bartlett's test was performed on SAS (Statistical Analysis System for IBM), the rest by Statview for Macintosh. **Clinical Classification:** When grouped by blood type, the range of food scores for IgE was 0 – 1600, which was used to establish a range for clinical classifications.

2.4 IgG methods

Method: IgG late food hypersensitivities were determined by Modified RAST. Tests were performed by Commonwealth Medical Laboratories. IgG antibodies to 34 foods were measured on 175 subjects for a total of 5950 food test scores. (An adjustment was made to equalize the varying blanks used by the lab.) **Means:** Mean scores for nine food groups were calculated for each subject by averaging similar foods. Then subjects were grouped by blood type, and the grand means calculated for each blood type (with standard error). **p-Value:** mRAST scores for IgG suffered similar problems to IgE: lack of bivariate normal distribution, and Bartlett's test also showed non-homogeneous data (before and after log conversion). So ANOVA and MANOVA could not be used. Thus p-values were determined by non-parametric tests (Kruskal-Wallis and Mann-Whitney U) on the means of the food groups. Bartlett's test was performed on SAS (Statistical Analysis System for IBM), the rest by Statview for Macintosh. **Clinical Classification:** When grouped by blood type, the range of food scores for IgG was 0 – 4600, which was used to establish a range for clinical classifications.

2.5 T-cell methods

Method: T-cell delayed food hypersensitivities were determined by ELISA/ACT® LRA (a patented one-step Lymphocyte Response Assay that measures activated kinase enzymes on T-cells). Tests were performed by ELISA/ACT Biotechnologies of Virginia, USA, a CLIA certified laboratory. Lymphocyte response to 200 foods was measured on 150 subjects for a total of 30 000 food test scores. Scoring & **Means:** This is a qualitative test (strong, mild, neg), where strong and mild reactions were weighted the same, and recorded as binary data. Reactivity for each blood type was determined by the percentage of subjects who reacted to each food (using Statview for Macintosh). Mean percentages for 14 food groups were then calculated by averaging similar foods**.** **p-Value:** ELISA/ACT food test scores were correlated to blood type categories. Bartlett's test showed homogeneous data. So p-values were determined by ANOVA AND MANOVA. Tests were performed on SAS (Statistical Analysis System for IBM). **Clinical Classification:** Clinical significance was based on 50th percentile and range of T-cell scores.

2.6 Lectin methods

Sixty-two ABO-specific lectins were obtained from the scientific literature. [1] Tables 3 – 7 report the number of lectins per food group for each ABO blood type.

2.7 Allergy history methods

An allergy history was taken on 100 subjects. This was based on the patients' perceived adverse reactions to ten foods: milk, cheese, yogurt, egg white, beef, pork, wheat, corn, tomato, and orange. The results were calculated as the percentage of reactive subjects to a specific food; p values were calculated by chi-square.

2.8 Clinical classification methods

Establishing classes for the degree of human clinical immune reactivity to foods is problematic in multiple ways: (1) assigning classes to frequency distributions (ranges) of continuous variables is arbitrary; (2) blood-type groups have less extreme ranges than individuals; and (3) the frequency distribution represents a range of healthy to unhealthy food reactions, rather than bivariate normal distribution. [2] (4) Standard deviations were not a good fit for this data. Therefore, the preferred method of classification was to establish five classes, beginning at the means (for all foods for all subjects), and ending at the maximum range of scores (for the biotype groups). Descriptive and numeric classifications were assigned. The IgE and IgG values are comparable to conventional lab values at the lower ranges. [See Table 2]

Table 2: Clinical Classification for Food Allergy and Hypersensitivity Tests

Class No.*	CLINICAL CLASS: Degree of Immune Reactivity of Each Biotype	IgE mRAST Antibody Scores	IgG mRAST Antibody Scores	T-Cell ELISA/ACT % Reactive Subjects
0	Non-reactive	0 +	0 +	0% +
1	Mild	450 +	1850 +	50% +
2	Moderate	700 +	2400 +	60% +
3	Strong	950 +	2950 +	70% +
4	Severe	1200 +	3500 +	80% +
5	Extreme	1450 +	4050 +	90% +

* Class 1 begins at or just above the mean scores or 50th percentile.
Class 5 ends just above the maximum range of scores for the biotype groups.

3. Results

Due to the enormous amount of data (41,900 test scores), mean scores are reported for food groups only. Raw scores for individual foods are beyond the scope of this summary article, as are results for gender, age and specific lectins. Scores are interpreted according to clinical classifications.

3.1 Blood type A1

Blood Type A1 had multiple food-group reactions, mostly IgG. IgE test means were Class 1 for nightshades, nuts-beans, and gluten-grains. IgG test means were: Class 4 for eggs, Class 3 for dairy, and Class 1 for gluten grains. Type A1 had significantly lower IgG scores than type A2 for gluten grains ($p = .0277$) and nuts-beans ($p = .0017$) by Mann-Whitney U. T-cell tests were: Class 1 for nightshades. Lectins were most numerous for nuts and beans.

Table 3: Food Test Results for Blood Type A1

FOOD GROUP	mRAST IgE Means ± SE	mRAST IgG Means ± SE	T-Cell: % Reactive Subjects	Number of Lectins [1] Reported *
Dairy	**377 ± 38**	**3150 ± 350**	**45%**	**----**
Eggs	**434 ± 46**	**3780 ± 385**	**23%**	**----**
Meats & Poultry	**396 ± 39**	**1220 ± 124**	**17%**	**----**
Seafood	**412 ± 35**	**1242 ± 119**	**14%**	**5**
Reptiles & Escargot	**----**	**----**	**----**	**3**
Grains: Gluten	**463 ± 61**	**1959 ± 201**	**17%**	**----**
Grains: Non-Gluten	**410 ± 41**	**1134 ± 149**	**21%**	**1**
Nuts & Beans	**486 ± 62**	**1539 ± 109**	**14%**	**11+**
Nightshades	**490 ± 76**	**1511 ± 156**	**57%**	**----**
Vegetables	**----**	**----**	**7%**	**3**
Fruits	**434 ± 52**	**1557 ± 139**	**13%**	**1**
Sugars	**----**	**----**	**41%**	**----**
Oils	**----**	**----**	**17%**	**----**
Herbs & Spices	**----**	**----**	**9%**	**1**
Food Additives	**----**	**----**	**25%**	**----**
OVERALL AVERAGE	439	1700	16%	Tot = 25+

- Additional bean lectins were reported for type A, but not named.

3.2 Blood type A2

Blood type A2 had multiple food-group reactions, primarily IgG, but no immediate reactions. IgE tests means were all Class 0. IgG tests means were: Class 5 for eggs, Class 4 for dairy, Class 2 for gluten grains, and Class 1 for nuts and beans and the overall average. These were one class higher for all reactive food groups than blood type A1. Type A2 had the highest IgG scores to eggs of all types (4277). Type A2 had significantly higher IgG scores than type A1 for gluten grains (p = .0277) and nuts-beans (p = .0017) by Mann-Whitney U. T-cell tests were: Class 2 for nightshades, and Class 1 for dairy. Lectins were most numerous for nuts and beans.

Table 4: Food Test Results for Blood Type A2

FOOD GROUP	mRAST IgE Means ± SE	mRAST IgG Means ± SE	T-Cell: % Reactive Subjects	Number of Lectins [1] Reported *
Dairy	**394 ± 43**	**3638 ± 346**	**56%**	**----**
Eggs	**434 ± 47**	**4277 ± 371**	**24%**	**----**
Meats & Poultry	**392 ± 67**	**1408 ± 178**	**13%**	**----**
Seafood	**345 ± 38**	**1474 ± 180**	**8%**	**4**
Reptiles & Escargot	**----**	**----**	**----**	**3**
Grains: Gluten	**350 ± 33**	**2661 ± 317**	**17%**	**----**
Grains: Non-Gluten	**345 ± 31**	**1348 ± 207**	**15%**	**1**
Nuts & Beans	**440 ± 63**	**2132 ± 142**	**12%**	**10+**
Nightshades	**327 ± 32**	**1223 ± 199**	**64%**	**----**
Vegetables	**----**	**----**	**5%**	**4**
Fruits	**316 ± 26**	**1405 ± 205**	**13%**	**1**
Sugars	**----**	**----**	**39%**	**----**
Oils	**----**	**----**	**17%**	**----**
Herbs & Spices	**----**	**----**	**8%**	**----**
Food Additives	**----**	**----**	**23%**	**----**
OVERALL AVERAGE	367	1937	15%	Tot = 23+

* Additional bean lectins were reported for type A, but not named.

3.3 Blood type B

Blood type B is the second-most allergic type, and had multiple immediate food-group reactions, plus other food responses. IgE test means were: Class 2 for nuts-beans, and Class 1 for gluten grains, nightshades, non-gluten grains, and the overall average. Type B had the highest IgE scores to nuts-beans (802) and non-gluten grains (515) of all ABO types. IgG test means were: Class 3 for eggs, Class 2 for dairy and gluten grains. T-cell tests were Class 1 for sugars, dairy, and nightshades. Type B had the highest T-cell score to sugars of all types, and was statistically significant by MANOVA compared to type AB (55% vs 37%) ($p = 0.029$). Lectins were most numerous for seafood.

Table 5: Food Test Results for Blood Type B

FOOD GROUP	mRAST IgE Means ± SE	mRAST IgG Means ± SE	T-Cell: % Reactive Subjects	Number of Lectins [1] Reported
Dairy	**472 ± 79**	**2748 ± 383**	**54%**	**----**
Eggs	**456 ± 86**	**3405 ± 512**	**28%**	**----**
Meats & Poultry	**448 ± 85**	**1144 ± 142**	**21%**	**----**
Seafood	**459 ± 86**	**1338 ± 132**	**14%**	**8**
Reptiles & Escargot	**----**	**----**	**----**	**2**
Grains: Gluten	**569 ± 118**	**2404 ± 231**	**18%**	**----**
Grains: Non-Gluten	**515 ± 107**	**1030 ± 112**	**18%**	**----**
Nuts & Beans	**802 ± 339**	**1810 ± 160**	**14%**	**5**
Nightshades	**560 ± 130**	**1395 ± 156**	**51%**	**----**
Vegetables	**----**	**----**	**6%**	**3**
Fruits	**435 ± 83**	**1360 ± 121**	**15%**	**2**
Sugars	**----**	**----**	**55%**	**----**
Oils	**----**	**----**	**15%**	**----**
Herbs & Spices	**----**	**----**	**8%**	**1**
Food Additives	**----**	**----**	**28%**	**----**
OVERALL AVERAGE	536	1694	17%	Tot = 21

3.4 Blood type O

Blood type O had one immediate food-group reaction and multiple IgG reactions. IgE test means were Class 1 for dairy. IgG test means were: Class 4 for dairy and eggs, Class 2 for gluten grains, and Class 1 for nuts-beans, and the overall average. Type O had significantly higher IgG scores than other types for nuts-beans ($p = .0231$), nightshades ($p = .0731$), and fruits ($p = .0264$) by Kruskal-Wallis. Type O also had the highest IgG score to gluten grains and non-gluten grains of all ABO types. T-cell tests were: Class 1 for dairy and nightshades. Lectins were most numerous for seafood. Type O had the highest scores of all blood types on all tests for dairy products.

Table 6: Food Test Results for Blood Type O

FOOD GROUP .	mRAST IgE Means ± SE	mRAST IgG Means ± SE	T-Cell: % Reactive Subjects	Number of Lectins [1] Reported
Dairy	**544 ± 117**	**3860 ± 408**	**59%**	**----**
Eggs	**446 ± 40**	**3654 ± 335**	**34%**	**----**
Meats & Poultry	**416 ± 42**	**1042 ± 100**	**14%**	**----**
Seafood	**442 ± 46**	**1631 ± 139**	**14%**	**7**
Reptiles & Escargot	**----**	**----**	**----**	**1**
Grains: Gluten	**389 ± 31**	**2687 ± 261**	**18%**	**----**
Grains: Non-Gluten	**391 ± 38**	**1647 ± 192**	**17%**	**----**
Nuts & Beans	**443 ± 38**	**1888 ± 164**	**13%**	**4**
Nightshades	**433 ± 48**	**1759 ± 181**	**51%**	**----**
Vegetables	**----**	**----**	**9%**	**1**
Fruits	**417 ± 40**	**1833 ± 160**	**14%**	**1**
Sugars	**----**	**----**	**47%**	**----**
Oils	**----**	**----**	**17%**	**----**
Herbs & Spices	**----**	**----**	**10%**	**1**
Food Additives	**----**	**----**	**25%**	**----**
OVERALL AVERAGE	432	2021	17%	Tot = 15

3.5 Blood type AB

Blood type AB had multiple food-group reactions, but no immediate reactions. IgE test means were all Class 0. IgG test means were: Class 3 for eggs and dairy, and Class 1 for nuts-beans and gluten grains. Type AB had significantly lower IgG scores than other types for nuts-beans (p = .0231), nightshades (p = .0731), and fruits (p = .0264) by Kruskal-Wallis. T-cell tests were: Class 1 for dairy, and were also the highest of all types for Crustaceans. Type AB had the most lectin reactions, which were most numerous for seafood, nuts and beans. Type A2B's had stronger reactions to dairy, eggs, and gluten grains than type A1B's. This reflects the same pattern seen in type A2 Vs A1.

Table 7: Food Test Results for Blood Type AB

FOOD GROUP	mRAST IgE Means ± SE	mRAST IgG Means ± SE	T-Cell: % Reactive Subjects	Number of Lectins [1] Reported
Dairy	**368 ± 45**	**3021 ± 512**	**54%**	**----**
Eggs	**400 ± 55**	**3465 ± 644**	**23%**	**----**
Meats & Poultry	**380 ± 38**	**1041 ± 163**	**15%**	**----**
Seafood	**375 ± 40**	**1591 ± 270**	**17%**	**13**
Reptiles & Escargot	**----**	**----**	**----**	**3**
Grains: Gluten	**379 ± 56**	**2011 ± 459**	**20%**	**----**
Grains: Non-Gluten	**395 ± 70**	**1292 ± 229**	**17%**	**1**
Nuts & Beans	**484 ± 74**	**2260 ± 317**	**10%**	**16**
Nightshades	**373 ± 52**	**1051 ± 193**	**37%**	**---**
Vegetables	**----**	**----**	**8%**	**4**
Fruits	**339 ± 50**	**1222 ± 242**	**14%**	**3**
Sugars	**----**	**----**	**37%**	**----**
Oils	**----**	**----**	**16%**	**----**
Herbs & Spices	**----**	**----**	**12%**	**1**
Food Additives	**----**	**----**	**22%**	**----**
OVERALL AVERAGE	390	1751	16%	Tot = 41

3.6 Blood type Rh-negative

Blood type Rh-negative is the most reactive of all blood types, and had multiple immediate, and other food-group reactions. IgE test means were: Class 2 for nuts and beans, and Class 1 for eggs, meats-poultry, gluten grains, nightshades, fruits, and the overall average. Rh-negative had significantly higher IgE scores to nuts-beans ($p = .0207$) and eggs ($p = .0794$) than Rh-positive by ANOVA. IgG test means were: Class 4 for eggs, Class 3 for dairy and gluten grains, and Class 1 for seafood, non-gluten grains, nuts-beans, nightshades, fruits, and the overall average. Rh-negative had significantly higher IgG scores than Rh-positive to: meats ($p = .0456$), seafood ($p = .081$), gluten grains ($p = .0152$), non-gluten grains ($p = .0291$), and fruits ($p = .0396$) by Mann-Whitney U. It had the highest IgE and IgG scores of all types to meats, seafood, gluten grains, nightshades, and fruits. [See Table 8.] T-cell tests were negative. There are no lectins for Rh-negative, as it is the absence of an antigen. Rh-negative had significantly lower T-cell scores to nightshades than Rh-positive by MANOVA (33% vs 59%) ($p = 0.005$). In contrast, IgE and IgG scores for nightshades were higher for Rh-negative than Rh-positive.

Table 8: Food Test Results for Blood Type Rh-Negative

FOOD GROUP	mRAST IgE Means ± SE	mRAST IgG Means ± SE	T-Cell: % Reactive Subjects	Number of Lectins [1] Reported
Dairy	**426 ± 65**	**3276 ± 433**	**49%**	**----**
Eggs	**568 ± 92**	**3802 ± 419**	**27%**	**----**
Meats & Poultry	**532 ± 94**	**1526 ± 191**	**14%**	**----**
Seafood	**493 ± 78**	**1775 ± 186**	**14%**	**----**
Grains: Gluten	**583 ± 106**	**3108 ± 346**	**15%**	**----**
Grains: Non-Gluten	**496 ± 85**	**1616 ± 183**	**18%**	**----**
Nuts & Beans	**908 ± 328**	**2214 ± 252**	**13%**	**----**
Nightshades	**575 ± 117**	**1813 ± 268**	**33%**	**----**
Vegetables	**----**	**----**	**9%**	**----**
Fruits	**503 ± 81**	**1893 ± 229**	**15%**	**----**
Sugars	**----**	**----**	**46%**	**----**
Oils	**----**	**----**	**18%**	**----**
Herbs & Spices	**----**	**----**	**10%**	**----**

Food Additives	**----**	**----**	**27%**	**----**
OVERALL AVERAGE	587	2174	17%	Tot = 0

3.7 Allergy History

The allergy history showed a significant distribution among ABO types to milk (p = .002), and cheese (p = .015), and wheat (p = .088) by Chi Square. These differences were reflected in IgG and IgE scores for type B for wheat, and type O for dairy. There was a significant distribution among Rh types to egg white (p = .074), and tomato (p = .033), and orange (p = .018) by Chi Square. These were reflected in both IgE and IgG scores. In general, the allergy history supported the study test results.

Table 9: Allergy History Results (Percent Reactive Subjects)

FOOD	A1	A2	B	O	AB	Rh-neg	Rh-pos
Milk	**40%**	**80%**	**50%**	**82%**	**80%**	**74%**	**64%**
Cheese	**20%**	**60%**	**60%**	**58%**	**40%**	**58%**	**43%**
Yogurt	**7%**	**0%**	**10%**	**16%**	**0%**	**11%**	**11%**
Egg white	**13%**	**0%**	**10%**	**8%**	**20%**	**21%**	**7%**
Beef	**17%**	**40%**	**0%**	**12%**	**0%**	**21%**	**11%**
Pork	**17%**	**0%**	**0%**	**4%**	**20%**	**11%**	**7%**
Wheat	**10%**	**20%**	**50%**	**32%**	**20%**	**21%**	**27%**
Corn	**7%**	**20%**	**10%**	**16%**	**0%**	**16%**	**11%**
Tomato	**10%**	**0%**	**20%**	**12%**	**20%**	**26%**	**9%**
Orange	**17%**	**0%**	**30%**	**20%**	**0%**	**37%**	**14%**

4. Discussion

4.1 Blood-group diet-typing systems

There are four previous diet-typing systems based on ABO blood types. (1) The first studies were conducted by two anthropologists, Kelso and Armelagos (1963), who statistically correlated ABO blood types to macronutrients for 31 cultural groups worldwide, and found that type A's ate higher fat diets, while type B's ate higher carbohydrate diets. [3] (2) Weissberg and Christiano published a popular book entitled *The Answer Is In Your Blood Type* (1999), which makes diet recommendations based on macronutrient levels and blood type. [4] (3) James d'Adamo published *One Man's Food* (1980), a popular book making specific food recommendations based solely on observation. [5] (4) His son, Peter d'Adamo published a similar popular book: *Eat Right For Your Type* (1996), [6] which also incorporated lectins, many of which do not match those lectins reported in the scientific literature. None of the diet-typing systems above is supported by original scientific studies, except that of Kelso & Armelagos. No other system employs original food allergy or hypersensitivity research, or reports objective and accurate data for specific foods, which severely limits their accuracy. Finally, no other system employs blood subtypes A1, A2 or Rh-negative, which hinders their specificity.

4.2 The Biotype research

An unexpected finding was that certain biotypes have higher scores to specific kinds of immune responses. For example: Blood types B, Rh-negative and males had much higher IgE responses than other types. Whereas blood types O, A2 and Rh-negative had the highest IgG responses. Type AB had the most lectin reactions (41), because it binds to both type A and type B lectins; whereas type O had the least lectin reactions (15) of ABO types. Rh-negative has no lectin reactions, because it is the lack of an antigen. T-cell responses were nearly uniform (15%-17%), not surprising, because T-cells do not express ABO antigens. However, T-cell tests scored high for dairy, sugars, and nightshades; the latter may be due to the fact that tomato lectin stimulates white blood cells. For this reason it is important to include multiple immune responses when devising a diet-typing system. In contrast, Peter D'Adamo cites lectins and pH as his only sources for diet choices. But there are only 62+ blood-type specific lectins in the scientific literature, and he misquotes a number of these [1]; pH has no known direct link to ABO types.

The blood types did correlate to specific food allergy patterns. However, diet categories showed cross-over and were not mutually exclusive. They did not divide neatly into vegetarians, omnivores and meat-eaters as d'Adamo claims. Instead all biotypes are omnivores, and seem based on adaptations to their evolutionary origins, with A1 as the Euro Diet, A2 as Arctic diet, B as Asian Diet, O as Tropical Diet, AB as Mid-East Diet, and Rh-negative as Basque Diet.

The Biotype research showed blood type A's to be omnivores, with low reactions to meats and poultry, but many reactions to lectins in beans (including soybean). Type A2's showed much stronger reactions to dairy, eggs and gluten grains than type A1's. These findings contradict d'Adamo's diet system, which asserts that all type A's should be vegetarians with grains, beans and soy as best foods. He also asserts lectins in sole/flounder and in oils, which cannot be verified in the scientific literature. [1]

The Biotype research showed blood type B's had the highest IgE allergy scores of all ABO types. This is supported by Mourant's report that type B had a significantly higher incidence of asthma and hives. [7] Notably, type B had the second highest lectin reactions to seafood. This contradicts d'Adamo's assertions that type B's have no allergies, and thrive on seafood, but react to sunflower lectin, corn lectin, and chicken lectin. There is no 'chicken lectin'; there is a 'chicken galectin', a cell-adhesion molecule that binds to WBC, but not to ABO antigens. [8] Sunflower contains an O lectin; while cornflakes contain an A lectin. [1]

The Biotype research showed blood type O's had high dairy and egg allergies and the highest IgG reactions to gluten grains (except for Rh-neg). This is supported by Mourant's report that type O had a significantly higher incidence of celiac disease (wheat gluten reactivity). [7] Type O's had the fewest lectins to beans or nuts. This contradicts d'Adamo's assertion that type O's should eat eggs and chocolate, but should avoid beans and corn, and limit nuts. Corn is not allergic for type O, nor an O lectin; while cocoa *is* an O lectin. [1]

The Biotype Research showed blood type AB's had the highest number of lectins of all types, mostly to seafood, nuts and beans. [1] Type A2B's had stronger reactions to dairy, eggs, and gluten grains than type A1B's. This contradicts d'Adamo's assertions that all type AB's have few lectins and thrive on seafood, wheat, dairy and eggs. He also asserts a banana lectin for type AB; but this lectin does not react with untreated human cells. [1]

5. Conclusions

The Biotype Diets research showed patterns in food-group allergies and hypersensitivities based on ABO and Rh blood types. These were supported by extensive data and statistical analysis. This is the only diet-typing system supported by comprehensive original scientific research. It is the first system to employ food allergies and hypersensitivities, and includes three kinds of testing, giving it greater accuracy. It is the only system that accurately reports food lectins. And it is the only system to employ blood subtypes A1, A2 and Rh-negative, giving it greater specificity. Therefore, it may be helpful to identify, predict, and prevent adverse immune responses to foods. More information is available at www.biotype.net.

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Note:

U.S.A. Provisional Patent Application # 60/587,827, Filed July 15, 2004.
U.S.A. Permanent Patent Application # 11/178,666, filed July 12, 2005.
U.S.A. Registered Trademark “Biotype Diets” granted June 2006.

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