

THE RELATIONSHIP OF VITAMIN C INTAKE AND THE TOTAL WHITE CELL COUNT

E. Cheraskin, M.D., D.M.D. *
W. M. Ringsdorf, Jr., D.M.D., M. S. **
F. H. Medford, B.S. ***
B. S. Hicks, B.S. ****

Department of Oral Medicine
University of Alabama in Birmingham
University Station, Birmingham, Alabama 35294

- * Professor and Chairman, Department of Oral Medicine,
University of Alabama in Birmingham
- ** Associate Professor, Department of Oral Medicine,
University of Alabama in Birmingham
- *** Research Assistant, Department of Oral Medicine,
University of Alabama in Birmingham
- **** Student Assistant, Department of Oral Medicine,
University of Alabama in Birmingham

INTRODUCTION

A recent report¹ suggested that the daily intake of vitamin C supplements yielded a reduction in the total white cell count. Quite apart from this report, another release² indicated that, when one selects a symptomless and signfree group of individuals from a large population with an average state of health, the total white cell count shrinks to within a relatively narrow range.

The purpose of this report is to determine, in the light of these two previously reported observations, the relationship of vitamin C intake and the total white cell count in a reasonably large sample of presumably healthy individuals.

Table One (line 1) shows a sample of 1043 persons consuming a daily range of vitamin C from 15 to 1120 milligrams with a mean and standard deviation of 330 ± 139 (as judged from a food frequency questionnaire). In this group, the total white cell count spreads from 3500 to 16800 with a mean and standard deviation of 6598 ± 1793 . Line 2 shows

Vitamin C Intake to Total White Count

those of the subjects consuming 50+ milligrams of vitamin C per day. The sample has now been reduced from 1043 to 1028 with a vitamin C range of 50 to 1120 and a mean and standard deviation for the vitamin C of 335 ± 187 . The WBC range is from 3500 to 16800 with a mean and standard deviation of 6599 ± 1787 . As one proceeds downward on Table One, the daily vitamin C intake increases, the sample size decreases progressively, the mean vitamin C intake increases, and the standard deviation shrinks. It is interesting that, as one proceeds from line 1 to line 11, the mean WBC decreases progressively from 6598 to 4940 per cubic millimeter. Equally interesting is that the standard deviation shrinks from 1793 to 1450.

The statistical significance of the relationships just described are summarized in Table Two. It is evident that the mean values are significantly different from the total sample as one eliminates those subjects consuming the lesser amounts of vitamin C (P_m). It is also evident that the standard deviation shrinks significantly under these same conditions (P_v).

In an earlier report², the point was made that the ideal white cell count is approximately 5000-6000 cells per cubic millimeter. In this report, the evidence suggests that, as one selects from a large sample a group of individuals characterized by the consumption of relatively large amounts of vitamin C, the white cell count is in the range of 5000-6000 cells per cubic millimeter.

SUMMARY

In an earlier report, evidence was presented from subjects without symptoms or signs of disease to indicate that the "ideal" total white cell count should be approximately 5000-6000 per cubic millimeter. The evidence derived from this study confirms this "ideal" range in a group of individuals characterized by a relatively large vitamin C intake.

REFERENCES

1. Robinson, A. B., Catchpool, J. R., and Pauling, L. *Decreased white blood cell count in people who supplement their diet with 1-ascorbic acid*. IRCS 3: 259, 1975.
2. Cheraskin, E., Ringsdorf, W. M., Jr., Medford, F. H., and Hicks, B. S. *The "ideal" total white cell count*. (in press)

relationship of reported daily vitamin C consumption (food frequency questionnaire) and WBC (white blood cell count) in a presumably healthy male and female sample

vitamin C (mg)	n	vitamin C		WBC	
		range	mean & S.D.	range	mean & S.D.
1) entire sample	1043	15-1120	330±189	3500-16800	6598±1793
2) 50+	1028	50-1120	335±187	3500-16800	6599±1787
3) 100+	964	100-1120	352±180	3500-16800	6567±1785
4) 200+	731	200-1120	418±158	3500-13500	6440±1645
5) 300+	516	300-1120	485±139	3500-13500	6325±1561
6) 400+	343	400-1120	556±119	3500-12500	6247±1493
7) 500+	217	500-1120	620±105	3700-12500	6166±1433
8) 600+	108	600-1120	692±101	3700-10600	6023±1389
9) 700+	31	700-1120	818±106	3700-10600	6097±1485
10) 800+	14	811-1120	903±103	3700-10600	6243±1899
11) 900+	5	918-1120	1012±98	3700-7000	4940±1450

Table One

statistical significance of the relationship of vitamin C intake (food frequency questionnaire) and white blood cell count

entire sample versus	t _m	P _m	t _v	P _v
1) 50+vitamin C	0.022	> 0.500	0.993	> 0.500
2) 100+vitamin C	0.394	> 0.500	0.991	> 0.500
3) 200+vitamin C	0.458	> 0.500	0.839	< 0.001**
4) 300+vitamin C	3.092	< 0.005*	0.757	< 0.005**
5) 400+vitamin C	3.588	< 0.001*	0.693	< 0.005**
6) 500+vitamin C	3.861	< 0.001*	0.638	< 0.005**
7) 600+vitamin C	3.970	< 0.001*	0.600	< 0.001**
8) 700+vitamin C	1.840	> 0.050	0.686	> 0.050
9) 800+vitamin C	0.736	> 0.400	0.892	> 0.500
10) 900+vitamin C	2.547	< 0.025*	0.654	< 0.005**

*statistically significant difference of the means

**statistically significant difference of the variance

Table Two