

# Blood Basophils and Histamine Levels in Patients

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Basophils circulate in blood and mast cells stay in the connective tissue or in the mucosal tissue. Although similar, they are not exactly the same type of cell. Both are made in the bone marrow. In allergies and asthma, histamine, one of the chemicals in basophils and mast cells, contributes to the symptoms associated with these diseases.<sup>1-3</sup>

Dr. Carl Pfeiffer and others have associated blood histamine levels with schizophrenia. A high level of blood histamine is called histadelia, a low level is histapenia. Drs. Pfeiffer and Sohler also stated that a high blood basophil count is a good predictor of high blood histamine. They obtained a correlation of  $r=0.864$  with basophil counts and blood histamine.<sup>4</sup>

In another article Pfeiffer stated that a “strong correlation ( $r=0.699$ )” existed between the basophil count and actual histamine levels, and basophil counts greater than 50 cells/mm<sup>3</sup> are associated with high histamine levels.<sup>5-6</sup>

Dr. Pfeiffer also warned that the basophil count was technique-dependent and should be performed immediately. A special stain of Alcian Blue dye is recommended to stain basophils.<sup>4</sup>

To examine the relationship between basophils and histamine levels, data from 338 patients who had blood histamine levels ordered at the BioCenter Laboratory were reviewed. Histamine levels were measured by one of the authors (SN), who has over 30 years experience in measuring blood histamine. The basophil

count was done by another author (JAJ) on blood within 30 minutes after the blood was drawn. All results are shown in Table 1. (p.108)

The data showed no correlation between absolute basophil counts and blood histamine. The patients with histadelia, who should have the highest basophil count, actually had the lowest. The highest basophil count was found in patients with normal histamine.

As mentioned before, technique in measuring blood basophils is very important. However, if technique was a problem, one would expect that basophils would be low in each population group studied.

As Table 1 shows, the basophils in the normal population and the histapenic group were in the accepted normal range. The lack of correlation between blood histamine and basophil count in these patients compared with previous reports is difficult to explain. One could argue that the basophil count is low in the histadelic patients because the basophils have reacted and released histamine stored in their granules.

The mean histamine level in the histadelic patients, 79.5 ng/mL, and 27.2 ng/mL in histapenic patients, is comparable to the results reported by Dr. Pfeiffer. He stated that blood histamine must be above 70 ng/mL to be diagnostic of histadelia.

Blood levels of 27.6 ng/mL or less (females) and 20.2 ng/mL or less (males) is diagnostic of histapenia.<sup>7,8</sup> There is usually an immunological step in the release of histamine from granules in basophils (or mast cells). An antigen

1. The Center for the Improvement of Human Functioning International, Inc., 3100 N. Hillside Ave., Wichita, KS 67219  
2. Article was written before Dr. Riordan's untimely death.

sensitizes an individual who then produces a specific antibody, IgE. The IgE then attaches to the basophil (mast cell) membrane.

When the same antigen comes in contact with the IgE again, the intracellular histamine, as well as other chemical mediators are released.

Perhaps this could explain the low basophil count in the high histamine group (Table 1). According to Dr. Pfeiffer, multiple allergies are usually present and often severe in patients with histadelia.

We will continue to review these parameters and report again on them in the future.

## References

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**Table 1.** Comparison of blood histamine levels with basophil count, absolute basophil count and total white blood cell count.

Total number	(n)= 338	Females (f) = 246	Males (m) = 92	
Histadelia	Mean Blood Histamine+ (ng/mL)	Mean Percent Basophils# (percent)	Mean Absolute Basophils' (per $\mu$ L)	Total WBC Count* (K $\mu$ L)
N=51 (m=22, f=29)	79.5 (range= 66 – 123)	0.56 (range= 0 – 4)	31 (range= 0 – 186)	6400 (range= 3400–11300)
Histapenia N=19 (m=6, f=13)	27.2 (range= 22 – 32)	0.95 (range= 0 – 2)	56 (range= 0 – 160)	6200 (range= 3300–8800)
Normal Histamine N=268 (m=64, F=204)	48.5 (range= 33 – 64)	0.69 (range= 0 – 5)	59 (range= 0 – 376)	5900 (range= 2800–13900)

+ = Normal blood histamine range by our method is 33 to 65 ng/mL.

# = Normal percent basophils counted per 100 cells on a WBC differential range from 0.0 to 2.0 percent.

The fractions represent a mathematical figure since it is impossible to count less than one basophil.

' = Normal absolute basophil count is the percent of basophils counted per 100 cells times the total white blood cell count. The normal range is 0.0 to 216  $\mu$ L.

\* = Normal total WBC count by our method is 4600 to 10800 K  $\mu$ L.