

What is a normal blood count?

What is a normal blood count? What is a normal neutrophil count? My neutrophil count is low, what does this mean? The doctor says I am neutropenic. If you are having chemo you will probably have a lot of blood tests (and a lot of questions.)

Remember a blood test on it's own probably doesn't mean all that much, when trying to work out what a blood test means, your doctors need to think about how much chemo you have already had and where in the cycle you are. They also look at the results of other tests (for example, scans) to decide if they need to do anything about an "abnormal" result. Quite often blood test results can vary from week to week, we are humans, not machines, so this is normal! Your doctors will also look at how your results have changed over several months.

But just what is a normal blood test result?

There are many different types of blood test; the results below are from a white blood cell count on a normal woman. A reference range is very important, this tells you what you would expect to see in a normal result. It is normal for the reference range to vary between hospitals and laboratories, it often depends which particular machine or method was used to count the cells. In order to understand a blood test you need to know the reference range used by the laboratory that did the test. The reference ranges given below are from a UK hospital.

Cell Type	Reference Range	Value ($10^9/L$)
1. White blood cells	4.0 to 11.0	8.1
2. Platelets	150 to 450	211.0
3. Neutrophils	1.5 to 7.5	6.7
4. Lymphocytes	1.0 to 4.0	0.7
5. Monocytes	0.20 to 0.80	0.42
6. Eosinophils	<0.41	0.26
7. Basophils	<0.11	0.02

Data from Understanding Cancer Ltd 2008

Or to put it another way, in a drop of blood about this size • (1 cubic mm, or 1 microlitre) there are about 8, 000 white blood cells and 211, 000 platelets.

Usually a blood test will tell you what types of white blood cell are present, so in the results above there are 6,700 neutrophils, 700 lymphocytes, 420 monocytes, 260 eosinophils and 20 basophils in that tiny drop.

How do you say that?

Neutrophil New-tro-fill

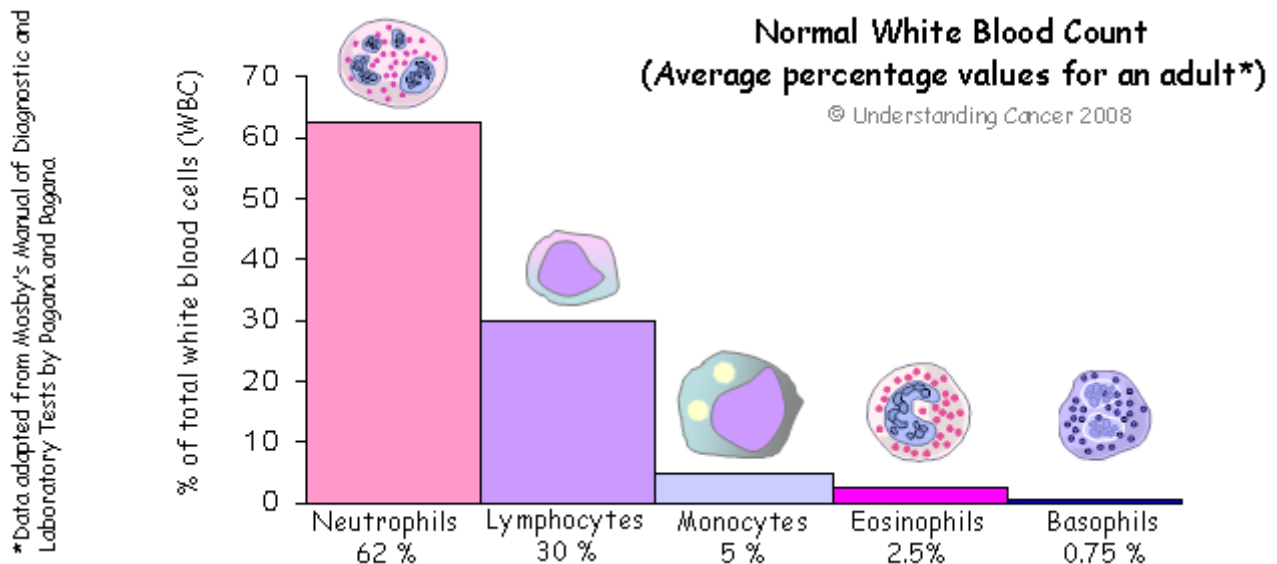
A neutrophil is a type of white blood cell, white blood cells help your body fight off infection from bacteria (germs) and viruses.

Neutropenia New-tro-pee-knee-a

This means the number of neutrophils in your blood is low. It can be caused by some types of chemo drugs. Your neutrophil level (or "count") can drop quite quickly after you start chemo.

What is normal?

Another way to look at a normal white blood cell count, is to draw a graph, of what is the average. The graph below shows the averages for a normal adult, but remember, these numbers are averages, your normal value might be higher or lower than the numbers shown on the graph and that is fine.



Why did I say the blood test values in the table were for a white women? What difference does it make? Well, men tend to be larger than women (on average, again there are always exceptions) so men tend to have more blood (and more blood cells). Children have less blood and again, the numbers for a child will be different to those of an adult.

What difference does race make? On average (again there are exceptions) West Indian or African people (or descendents of these peoples) tend to have a different normal range for white cell counts, absolute neutrophil counts and platelet counts.

I am a white female, if I had a platelet count of 124 that would be considered lower than normal, however if I was an African woman that would be perfectly normal. These are biological differences, measured in many thousands of people. What is important is that the doctors treating you know what is normal for you.

One of the best summaries of "Typical normal values for Blood test results" can be found in the leukaemia booklets that you can download from the Leukaemia Research Fund website. The results are usually found in a table right at the back. Here is a link to a booklet called Leukaemia and related diseases, the table is on page 83 (the second last page of the book). You will need adobe acrobat reader to open the file or you can ask the LRF to send you a hard copy. Please note these booklets are written for people in the UK who are receiving treatment from the NHS.

Conclusions

What does this mean?

So to answer the questions at the start...

What is normal? Well normally about slightly more than half (~60 %) of your white blood cells should be neutrophils. The remaining third (~30 %) of your white cells should be lymphocytes. The remainder is made up of monocytes, eosinophils and basophils.

If you don't have as many neutrophils as you should have you have "neutropenia". This can be caused by some types of chemotherapy drugs and is also seen in some types of leukaemia. Neutropenia is sometimes treated by giving G-CSF which stands for granulocyte-colony stimulating factor.

If you are having chemo, your doctors will have an idea of what blood levels are normal for you. Your neutrophil levels usually increase, without treatment when you stop chemo.

Acknowledgments and Links to Further Information

http://www.lrf.org.uk/media/images/Leuk&RelatedDisorders07_4696.pdf

<http://www.lrf.org.uk/>

The clipart images are taken from SmartDraw 2008 and the data is from Understanding Cancer Ltd and Mosby's Manual of Diagnostic and Laboratory Tests (3rd Edition) Pagana and Pagana.

For more information on blood tests, please visit our webpage <http://www.understandingcancer.co.uk>, we have online courses and also offer face to face courses and tutorials given by a real live scientist (!)