



Immune-mediated Diseases - IMHA, IMTP and IMPA - Part 1



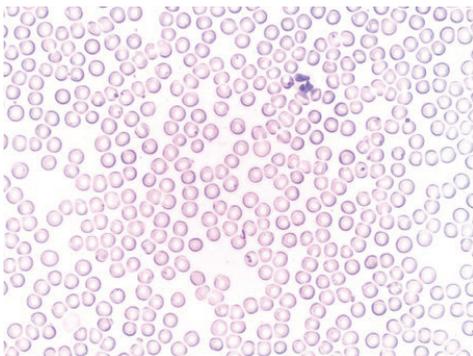
I think the immune system is one of the most incredible, and advanced, 'systems' that nature has created, and we are years from knowing how it really works. It protects against infectious organisms (eg. bacteria and viruses), responds/reacts to physical, chemical and heat damage, is essential for healing, protects against some cancers, and removes old cells and debris from the body. Its most impressive feature, however, is that it knows a) what is 'self' (ie. our own, healthy body tissues and cells), and what is not, and b) if it is not 'self', what is dangerous, and what is not.

In this 2 part series, I am going to talk about three examples of 'immune-mediated disease' - IMHA, IMTP and IMPA. IMHA stands for immune-mediated haemolytic anaemia, IMTP stands for immune-mediated thrombocytopaenia, and IMPA stands for immune-mediated polyarthritis. I understand these are long words which may mean very little, but I will go through each of them in turn. Bear in mind, these are just three examples, and there are many other immune-mediated diseases. Hypothyroidism in dogs, for example (see article 6), is often caused by immune-mediated destruction of the thyroid gland.



Before looking at these examples, however, it is important to understand what the immune system is, and what 'immune-mediated disease' means. I will cover this in the rest of part 1. In part 2, I will go over the signs and diagnosis of IMHA, IMTP and IMPA, and how these diseases are treated.

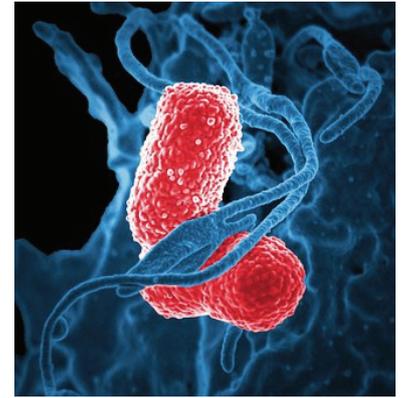
The Immune System



The immune system is made up of:

- 1) various types of cells, including neutrophils, eosinophils, monocytes/macrophages, basophils, mast cells, the cells which line the blood vessels, T-cells, and B-cells;
- 2) the antibodies, proteins, and/or chemical which these cells produce;
- 3) a mini 'system' called the 'complement cascade'

There are two types of immune response - the innate immune response, and the adaptive immune response. The innate immune response can be thought of as the first line of defence, and its job is to detect the danger, and alert the rest of the immune system to the problem. It is 'non-specific' so it reacts the same way to every danger it is exposed to regardless of what it is. It is responsible for triggering the 'inflammatory' response (pain, heat, redness and swelling) and 'acute phase' response (fever, lethargy, lymph node enlargement and possibly joint pain).



The adaptive immune response comes later, and this is targeted against a specific danger, such as a specific bacterial species, or a specific toxin. It also generates a 'memory' so if the immune system is exposed to the same danger again, it has all the tools already prepared to destroy it more quickly. The way in which it all works is remarkable, but unfortunately the details are too complex to cover here.

Immune-mediated Diseases (IMDs) - what are they?



We have endless amounts of 'foreign' substances passing through our gut, passing through our nose and lungs, and being applied to our skin, eyes and hair every day; we also have millions of different organisms living both inside us and on our skin. The same is true for animals, and the immune system is exposed to virtually all of this. 99% of the time, the immune system works out what is dangerous, and what is not, and acts accordingly.

However, when this goes wrong, and the immune system starts reacting to harmless substances/organisms, or even worse, **starts reacting to 'self' body tissues or cells, which are often completely healthy, it can cause severe disease.** An 'attack' by the immune system on normal ('self') body tissues is what leads to immune-mediated disease.

For those interested, immune-mediated disease and auto-immune disease are not the same thing. Auto-immune disease is just one of the two types of immune-mediated disease, the other type being auto-inflammatory disease. Whether an immune-mediated disease is an auto-immune disease or auto-inflammatory disease depends on whether it is the innate or adaptive immune system going wrong.

Immune-mediated Diseases (IMDs) - why do they develop?

It is still unclear exactly why IMDs develop, but, in essence, some 'trigger' stimulates the immune system to



start attacking normal tissues. In some cases, this ‘trigger’ can be identified. For example, some infections (especially tick-borne infections) can trigger IMDs, as can some medications, toxins and cancers. However, in many cases, the ‘trigger’ is unknown, and the disease is termed ‘idiopathic’, meaning ‘of unknown cause’. As I am sure you can appreciate, it is very important to try to find out if there is a detectable ‘trigger’ because unless it is treated, or removed, the IMD will continue.

Genetics do appear to play a role in IMD. Cocker spaniels, for example, are pre-disposed to IMDs, and ‘Shar pei’ fever is an inherited IMD in Sharp pei dogs. Female animals are also more likely to develop IMDs than males, which may be due to the extra ‘X’ chromosome that females carry. It is thought that the normal bacterial flora in the gastro-intestinal tract, skin and upper respiratory tract may be a factor.

I hope you have enjoyed the first part of the series. Please get in touch if you have any questions about it. I understand it has been quite ‘sciency’, but it is important to have the background to immune-mediated diseases before I go on to discuss the examples in part 2.

