PRESENTING… IRON MAN!

Dr. Wilf Jefferies is an immunologist whose laboratory is involved in a number of research areas. In particular, members of his group look at the ability of our immune system to monitor the body, and other members focus on a brain protein known as p97. Dr. Jefferies uses mammalian models and specifically mouse genetics to answer key biological questions in these areas.

Dr. Wilf Jefferies

Dr. Jefferies is also interested in studying the function of a brain protein known as p97 or melanotransferrin. It is thought that this molecule plays a key role in iron transport within the central nervous system. Evidence from Dr. Jefferies lab has implicated a link between the action of this molecule and Alzheimers disease, a very common neurodegenerative disorder that causes dementia.

Iron is an element that is necessary for normal bodily functions. This is in part due to its reactive nature which allows it to be an excellent component of many metabolic pathways; and also due to its importance in hemoglobin function for oxygen

collection. However, because of its reactiveness, iron can also be very toxic which is why its transport and storage in cells is carefully controlled.

* Your immune system is an elaborate biological tool that has the remarkable job of making sure that your body is capable of responding to any harmful change. This includes dealing with bacteria or viruses that invade and cause disease, and it also includes monitoring for other differences such as cells that have become cancerous.

Genetically modified mice such as transgenic mice have been invaluable in medical research. Many mutant mice are used as disease models that have provided insight into potential medical treatments.

* In effect, this defence system is dependant on the ability of your body to "recognize" these foreign intruders. You can imag ine that in order to be effective, the system has to be able to potentially recognize anything! In reality, your immune system has developed the amazing ability to recognize up to a billion different things.

The immune system is very much like your body's personal police force. It has to able to differentiate between the "good" (your own normal cells) from the "bad" (foreign cells such as a bacteria), and deal with them accordingly.

*Most aggresive and traveling (metastasizing) cancers have somehow figured out a way to avoid being seen by the immune system.Among the many tricks that a tunour cell uses,is the ability to lose the expression of key molecules that normally "present" information to the immunesystem. A group of these molecules form a family known as the major histocompatibility complex. Research has shown that cancers with non-functional major histocompatibility complexes cannot be "seen" or effectively cleared by your immune response.

* Part of Dr. Jefferies' research involves using mouse genetics to look at whether there are any therapeutic strategies that can restore the ability of immune system to detect cancer cells . In effect, to restore expression of molecules such as the major histocompatibilty complexes in tumours so that they are no longer invisible. Recent data shows that this strategy shows promise as an effective way of treating aggresive cancers.

KEY WORDS

transgenic mouse: a mouse that has been genetically modified to include the addition of a new gene.

major histocompatibility complex: often abbreviated M.H.C. This is an important group of proteins that play a major role in allowing cells within your body to be monitored by the immune system.