Recent developments in neuroscience have allowed us to study diseases in new ways, looking beyond neurons to other exciting parts of the brain. Scientists can make mouse models of many different disorders, and answer questions about their brain cells. For example: what causes intellectual disability in people with Down Syndrome?

You may be surprised to learn that the answer involves more than just neurons, with cells called 'microglia' playing an important role. Microglia have an important protective function in the brain where they help fighting infections and supporting neural circuits. However, in Down Syndrome these cells are overactive, causing them to prune away too many connections between neurons.
By targeting microglia, they found ways to improve some of the symptoms in mice with Down Syndrome. What they did was to use acetaminophen, a mild pain reliever found in some cold medicines, to lessen overactivity in these cells. Their results show that not only did the mice do better on a memory test, but they had a normal number of connections between neurons. These improvements in brain circuitry open up avenues to new research into disease mechanisms. Perhaps they may even translate into new treatments.

This discovery is sensational news for scientists and non-scientists alike. With improved knowledge of what causes Down Syndrome, there is a whole new area of research to explore. What’s more is that this work shows that some of the problems that are at the core of the disorder can be reversed. With these promising new findings, we can hope that scientists may soon be able to do this in humans as well!
With such a high number of experiments being done in males, should we expect the same result for females? What are the implications for drug development studies? In particular, a rather controversial topic revolves around the use of cannabis for therapeutic purposes in males and females. Renewed interest in the therapeutic applications of cannabis has been seen in several diseases, including epilepsy, anxiety, cancer, and Alzheimer’s disease, be it in the form of extracts or isolated phytocannabinoids, such as tetrahydrocannabinol (THC). However, surprisingly little is known about its effects in females. To address this question, a new study compared the effects of THC drugs between males and females.

Their results showed that the brain metabolic rates of individuals exposed to this type of drugs display sex-specific differences, in keeping with previous observations. What’s more, they found sex-dependent effects of THC on behaviour by showing that it causes increased anxiogenic behaviour in females but not in males. These findings show that sex-specific variations in brain connectivity and function must be taken into account in therapeutic studies. In addition, to better understand how the brain functions, research should not predominantly focus on males but consider approaches that look at both genders.

More on the authors..

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