Further Inform Neurogenetic Disorders

Genetics of Prader-Willi Syndrome

Prader-Willi syndrome is caused by missing pieces of genetic information on the paternal copy of chromosome 15 (we inherit two copies of each chromosome- one from each parent and have 46 chromosomes in total). Missing genetic information in the same region of the maternal (mother's) copy of the chromosome results in another genetic syndrome calledAngelman syndrome.

The specific region of chromosome 15 affected in Prader-Willi syndrome is called 15q 11-13. This simply locates the missing genetic information to a particular area on the chromosome.

While most genes are active on both parental chromosome copies, some (called imprinted genes) are active only on one copy. The genes involved in Prader-Willi syndrome are imprinted genes which are normally active only on the paternal copy of chromosome 15.

The missing genetic information from 15q 11-13 that results in Prader-Willi syndrome can be lost by one of several genetic mechanisms:

- Deletion: Approximately 70% (7 out of 10) of cases of Prader-Willi syndrome are due to a deletion at the segment labelled 15q11-13 of the paternal chromosome. This means that part of the chromosome is simply missing.
- Maternal uniparental disomy: Approximately 25% of individuals with Prader-Willi syndrome have a uniparental disomy which means that both copies of chromosome 15 have been inherited from the mother rather than one copy from each parent. This means that the father's whole copy is missing. This is more common in children of older mothers.
- Translocation, mutation or other defects:Whilst rare, Prader-Willi syndrome is occasionally caused by a translocation which is where the chromosomes are rearranged. It can also be caused by a defect of the imprinting mechanism which means that some of the genes on the paternal copy of 15q11-13 become inactive or 'silenced' when they are supposed to be active.

For more information on the genetics of Prader-Willi syndrome, click here.

For more information on uniparental disomy and genomic imprinting, click here.