Prader-Willi syndrome

Prader-Willi syndrome (PWS) is a complex genetic disorder characterized by a wide range of physical, cognitive, and behavioral features. It was first described by Swiss doctors Andrea Prader, Alexis Labhart, and Heinrich Willi in 1956. PWS affects both males and females and occurs in approximately 1 in 10,000 to 1 in 30,000 live births.

Prader-Willi syndrome is typically caused by the absence of genetic material in a specific region of chromosome 15. There are several genetic mechanisms that can lead to the loss of this genetic material, including:

1. Deletion: Approximately 70% of cases of PWS result from a deletion in the paternal copy of chromosome 15 in the region known as 15q11-q13. This deletion leads to the loss of critical genes involved in the regulation of appetite, growth, metabolism, and other functions.
2. Uniparental disomy (UPD): In about 25% of cases, individuals inherit two copies of chromosome 15 from the mother and none from the father (maternal UPD). This results in the absence of paternal genetic material in the critical region, leading to the characteristic features of PWS.
3. Imprinting defect: In a small percentage of cases, there is an abnormality in the imprinting process, which results in the silencing of specific genes on the paternal chromosome 15. This leads to a loss of gene function similar to deletion or UPD.

The hallmark features of Prader-Willi syndrome include:

1. Hypotonia: Infants with PWS typically have poor muscle tone (hypotonia), which can affect feeding and motor development.

2. Feeding difficulties: During infancy, individuals with PWS may have difficulty feeding due to weak muscle tone and poor suckling reflex. This may lead to failure to thrive in the newborn period.
3. Hyperphagia and obesity: One of the defining characteristics of PWS is an insatiable appetite and a tendency to overeat (hyperphagia). Without strict dietary management, individuals with PWS are at high risk of developing obesity, which can lead to serious health complications.
4. Short stature: Children with PWS often have growth hormone deficiency, leading to short stature if left untreated.
5. Hypogonadism: Individuals with PWS typically have underdeveloped or incomplete development of sexual characteristics, delayed or absent puberty, and infertility due to hypogonadism.
6. Behavioral and cognitive issues: Individuals with PWS may exhibit cognitive delays, learning difficulties, and behavioral problems such as obsessive-compulsive behaviors, temper tantrums, and skin-picking.
7. Sleep disorders: Sleep-related breathing disorders, such as obstructive sleep apnea, are common in individuals with PWS and can contribute to daytime sleepiness and behavioral issues.

Prader-Willi syndrome is a lifelong condition that requires comprehensive medical care, including growth hormone therapy for growth hormone deficiency, strict dietary management to control food intake, behavioral interventions, and monitoring for associated health issues such as obesity, sleep disorders, and psychiatric disorders. Early intervention and a multidisciplinary approach involving pediatricians, endocrinologists, geneticists, psychologists, dietitians, and other healthcare professionals are essential for optimizing outcomes and quality of life for individuals with PWS and their families.