UNIVERSITÄTSMEDIZIN GÖTTINGEN UMG
Institut für Humangenetik

Progeroid Syndromes

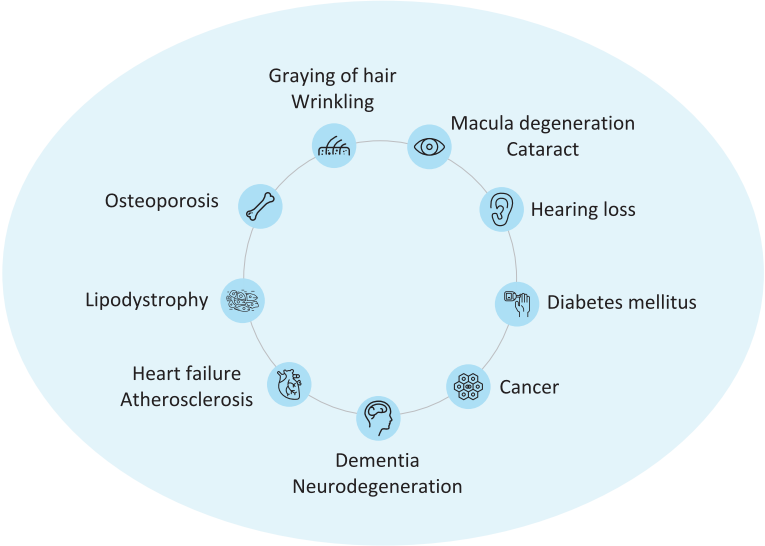
Multidisciplinary Counselling - Inspired Research - Advanced Diagnostics

What are progeroid syndromes?

Progeroid syndromes are rare congenital disorders characterized by signs and symptoms of premature or accelerated aging. They may, for example, lead to early manifestation of age-associated conditions such as heart diseases, cancer or neurodegenerative disorders.

What are the key features of progeroid syndromes?

Usually, the aging-associated features of these syndromes do not involve the organism as a whole. Instead, one or multiple organ systems or tissues are affected and exhibit typical signs of aging ("segmental progeroid syndromes").



How are progeroid syndromes diagnosed?

Numerous progeroid syndromes have been described with often considerably overlapping phenotypes, which makes it challenging to establish a precise clinical diagnosis. Next-generation sequencing (NGS) technologies provide a new and valuable tool that can simplify the diagnostic process and allow a molecular diagnosis.

What is the cause of progeroid syndromes?

Progeroid syndromes are mostly single-gene disorders. As far as the specific responsible genes are known, they encode mainly proteins that impact on the nuclear lamina architecture and chromatin structure or act in various mechanisms involved in DNA damage repair and thus contribute to genome maintenance.

What management option do exist?

The management of patients with progeroid syndromes requires a coordinated effort and collaboration of multiple specialists with expertise on the symptoms present in each individual. To provide such a comprehensive and interdisciplinary approach, patients should as early as possible be referred to a specialized center for rare diseases.

Center for Progeroid Syndromes

Progeria Clinic

We perform a specific clinic for accelerated-aging disorders and progeroid syndroms within the Center for Rare Diseases Göttingen, organized in a broad collaborative engagement with the Pediatric Department and other departments of the University Medical Center. In this clinic, patients and their families have access to clinical and molecular diagnostics, human genetic counselling, and treatment based on expertise from different disciplines.

With this multidisciplinary approach, we aim at establishing an accurate diagnosis as early as possible in the life of affected individuals, thus providing the basis to decide about appropriate management options.

We rapidly translate our research findings into clinical practice so that our patients receive state-of-the-art care.

→ **Contact & Appointments**

New Genes - New Mechanisms

Progeroid syndromes are one of our key research areas. We use whole-genome and whole-exome sequencing to discover new causative genes. Then we functionally analyze identified variants and their encoded proteins to explore how they act in signaling pathways and molecular mechanisms and what cellular processes underlie aging-associated pathologies.

Chromatin structure & remodelling
How certain factors control chromatin structure and transcription is a question that we are currently addressing in relation to novel genes for Hallermann-Streiff syndrome.

Instability of nuclear membrane
We have discovered mutations in genes whose products impact on the nuclear lamina architecture and we are now investigating how this may lead to accelerated aging.

Transcriptional regulation
Having identified the genetic basis of Wiedemann-Rautenstrauch syndrome, we are unravelling the mechanisms by which transcriptional defects give rise to this neonatal progeroid syndrome.

Mitochondrial dysfunction
We systematically explore how mitochondrial dysfunction impacts on aging processes in our patients with progeroid syndromes and we functionally analyze mutations in novel genes with mitochondrial functions.

→ **Current progeroid syndrome projects of Wollnik lab**

NGS-Based Diagnostics

We currently offer testing of 85 genes for progeroid syndromes in specific panels for NGS-based diagnostics:

- Hutchinson Gilford progeria syndrome
- Mandibuloacral dysplasia
- Nestor-Guillermo progeria syndrome
- Wiedemann-Rautenstrauch syndrome
- Werner syndrome
- Ruijs-Aalfs syndrome
- Cockayne syndrome
- Xeroderma pigmentosum
- Bloom syndrome
- Lipodystrophy
- Marfan lipodystrophy syndrome
- Short syndrome
- Keppen-Lubinsky syndrome
- Penttinen type of premature aging syndrome
- Cutis laxa associated syndromes
- Lenz-Majewski syndrome
- Rothmund-Thomson syndrome
- Dyskeratosis congenita
- Ataxia-teleangiektasia

→ **Progeroid syndrome panels Request form**

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