

# An experienced **organ-on-a-chip** scientist

## Sebo Withoff

### PhD, Associate Professor

After studying **Biology at Groningen University**, Sebo obtained his **PhD** (chemotherapy resistance mechanisms in lung cancer) in **Medical Sciences** at the **University Medical Center in Groningen (UMCG)**, where he also conducted **postdoctoral research** in the fields of **oncology** and **tumor immunology**.

After 8 years and two positions in the **United States** (The Salk Institute – Dept. of Genetics, La Jolla & St. Jude Children’s Research Hospital – Dept. of Immunology, Memphis), he returned to **Groningen** in **2011**. As an **Associate Professor**, he now **co-chairs the Immunogenetics Lab** of the **Department of Genetics at UMCG** and is a **member of the management team** of the department.

In his postdoctoral positions, Sebo worked on **novel developments** in the **oncology** and **immunotherapy** fields such as:

- **Semliki Forest virus-based gene therapy approaches**
- **Bi-specific antibody technology**
- **Lentiviral delivery systems**
- **Next-generation sequencing methods**

Back in Groningen, he applied this expertise to study the role of **micro-RNAs** and **long non-coding RNAs** in **complex genetic disorders**, with a focus on **celiac disease**.

Since **2017**, Sebo has led the **intestine-on-chip program** of the **NWO Gravitation project "Netherlands Organ-on-Chip Initiative (NOCI)"**. He uses:

- **Human stem cell-based intestine-on-chip systems**
- **Standard organoid models**
- **Organoid-immune cell co-cultures**

These tools help study the role of **epigenetic**, **genetic**, and **environmental factors** in complex genetic diseases such as **celiac disease**.

Because he uses **stem cells from healthy and diseased human donors**, these models capture **genetic predispositions for health and disease**, making them ideal **precision medicine platforms**.

At the **Groningen Microbiome Hub**, he is also working on introducing the **human microbiome** into the **intestine-on-chip platform**. This integrated system can be applied to:

- Study **mucosal immune system homeostasis** in intestinal complex diseases (e.g., **celiac disease**, **inflammatory bowel syndrome**, **colorectal cancer**)
- Investigate **first-pass drug metabolism**
- Explore **nutrient uptake**