Overview selected candidates Oncode Institute

Senior Investigators

Regulation of the T-cell response against cancer

Prof. Jannie Borst - Department of Immunohematology and Blood Transfusion, Leiden University Medical Center

In recent years it has become apparent that our immune system presents us with a chance to combat cancer. Specifically, cytotoxic T lymphocytes (CTLs) are our weapons against infection and cancer. Prof. Jannie Borst aims to identify the molecular mechanisms underlying the anti-tumour effect of CTLs. Furthermore, she focuses on the differences in signaling pathways between conventional and regulatory T-cells. The selection committee highly valued the proven valorization capabilities of Borst, as she has brought a new cancer immunotherapy drug to the clinic, starting from initial target discovery.

Key driver genes of heritable cancer

Prof. Lude Franke - Department of Genetics, University Medical Center Groningen

In his career, prof. Lude Franke has developed several computational methodologies to identify the downstream molecular consequences of genetic risk factors. By joining Oncode Institute, he now has the opportunity to systematically apply these tools to many different types of cancer. His approach opens up new avenues for other Oncode Investigators: “I believe my data-driven approach might yield new hypotheses that could be tested by other Oncode researchers and, vice-versa, I will be able to complement ongoing Oncode research with functional genomics datasets, expertise and analyses”, according to Franke.

Integrative Structural Biology for drug discovery

Prof. Anastassis Perrakis - Department of Biochemistry, Netherlands Cancer Institute

Deep insights into (macro-)molecular structures is vital for understanding biological function and translating basic molecular research towards novel therapeutics. Prof. Anastassis Perrakis has an extensive track record in integrative structural biology: “The unique skill-set of my research team in Integrative Structural Biology, allows us to do forefront methodological research while engaging in exciting collaborations that address important biological questions.” He has experience in collaborating with the private sector and brings important technological expertise into Oncode Institute to speed up the process from *hit to lead* in drug development.

Medicinal Chemistry to Discover Anti-Cancer Drugs

Prof. Mario van der Stelt - Molecular Physiology, Leiden Institute of Chemistry, Leiden University

Trained as a medical chemist, prof. Mario van der Stelt gained experience in a large pharmaceutical company and now heads his own research group at the Leiden Institute of Chemistry. His lab is recognized internationally for the design, synthesis and application of small molecules as chemical tools to control and visualize protein activity. This can be employed to design and synthesize novel anti-cancer drugs against Acute Myeloid Leukemia or breast cancer, but also allows identification of novel drug targets and to biochemically characterize existing drugs.

Experimental Cancer Immunology and Therapy

Prof. Sjoerd van der Burg – Department of Medical Oncology, Leiden University Medical Center

Currently, immunotherapy is regarded as the most innovative cancer therapy. The goal of prof. Sjoerd van der Burg is to improve immunotherapeutic strategies against solid tumours. Within Oncode, he will focus on expanding the molecular targets for immune therapy and investigate the role of myeloid cells, with follow up in clinical studies. Other topics his lab addresses are the mechanisms behind relapse of immune sensitive tumours and the effects of chemotherapeutic strategies on the immune system. He adds: “I expect that Oncode can take away the lag-time between inventions in one Dutch institute and testing or using those in another.”

Delivering precision medicine by integrating multidimensional information

Prof. Emile Voest, MD-PhD - Molecular Oncology & Immunology, Netherlands Cancer Institute

How are tumour cells recognized by the immune system? And, perhaps even more important, how do they evade the immune system? Prof. Emile Voest will try to answer these questions to boost the field of precision medicine in oncology. In his approach he will use autologous tumour organoid and T-cell pairs of patients with epithelial tumours and whole genome sequencing data of tumours treated with immunotherapy. Voest will add yet another strong link to the clinic: “I am a medical oncologist performing not only clinical or translational research but also basic research.”

How post-transcriptional regulation drives T-cell function

Dr. Monika Wolkers – Department of Hematopoiesis, Sanquin Research

Dr. Monika Wolkers brings her longstanding expertise in T-cell biology into Oncode institute. Specifically, she focuses on post-transcriptional gene regulation in T-cells and how this affects anti-tumour effects of the immune system. “Mouse models allow us to study the fundamental

aspects of T-cell responses, while our study on tumour-reactive human T-cells allows translation to clinically relevant models like non-small-cell lung cancer derived T-cells", Wolkers explains. In her experience, cross-talk between disciplines - as stimulated in the Oncode Institute - yields to highly innovative research.

Junior Investigators

Data science in cancer research

Dr. Jeroen de Ridder - Center for Molecular Medicine, University Medical Center Utrecht

Through his training at the NKI and the Delft University of Technology, dr. Jeroen De Ridder has developed into a bioinformatics scientist with a solid background in computational data science. His primary aim within Oncode Institute is to better predict cancer phenotypes. He will do this by analyzing cell free circulating tumour DNA isolated from easy accessible liquid biopsies. "To achieve this, we need to develop extremely accurate measurement technologies, on a genome wide scale, and robust machine learning methods that can deal with sparse randomly sampled data", according to De Ridder.

Rhabdoid tumours: molecular dissection and therapy development

Dr. Jarno Drost – Princess Máxima Center for Pediatric Oncology

Childhood cancer is still the leading cause of death by disease in the developed world among children. So far, research has been hampered by a lack of cell lines and animal models truly representing pediatric renal and rhabdoid tumours. Dr. Jarno Drost aims to develop those by means of organoid models for these tumours, eventually allowing him to study personalized treatment and characterize the development of normal and malignant kidneys. About joining Oncode Institute he says: "For a young PI, Oncode represents a unique environment to do state-of-the-art science with the right guidance, funding support and collaborations."

Hematopoietic stem cells in myeloid malignancies

Dr. Rebekka Schneider, MD-PhD – Department of Hematology, Erasmus Medical Center

Dr. Rebekka Schneider is a physician-scientist with a focus on myeloid malignancies. With her team she aims to dissect the interaction between (pre-)malignant hematopoietic stem cells and the microenvironment in myeloid malignancies and how this interaction contributes to disease initiation, progression and fibrosis in the bone marrow. She is looking forward to joining Oncode: "It is my ultimate goal to quickly translate findings regarding novel treatments and diagnostic procedures to the clinic. Oncode Institute helps to guide us regarding topics like technology transfer, intellectual property law and creation of spin-offs."

Mechanisms underlying childhood cancers

Dr. Ruben van Boxtel - Princess Máxima Center for Pediatric Oncology

The overall aim of the research of dr. Ruben van Boxtel is to determine why children can develop cancer. Although aging is the biggest risk factor, the incidence of some cancers peaks early in life and decreases before rising again with age. With his group he aims to clarify this paradox and by doing so obtain novel insights into the mechanisms and rate-limiting steps underlying cancer initiation in children. Next to that, he will explore how cancer treatment causes second malignancies in childhood cancer survivors.

Bridging the gap in gastrointestinal malignancies

Prof. Louis Vermeulen, MD-PhD - Center for Experimental Molecular Medicine, Amsterdam UMC

By joining Oncode Institute, prof. Louis Vermeulen, a medical oncologist in training, wants to further expand his impact in the field of gastrointestinal malignancies. With his research, ranging from fundamental biology to clinical applications, he aims to understand molecular cancer subtypes and their specific interaction with the immune system. Next to that, his group uses CRISPR based technologies to follow tumour growth dynamics, responses to therapy and the influence of the microenvironment on tumour growth. Vermeulen adds: “Valorization support by Oncode and the experience of the other Oncode Investigators will be invaluable to drive clinical implementation of our discoveries.”