

CURRICULUM VITAE



Jarno Drost, PhD

Group leader at the Princess Máxima Center for Pediatric Oncology and Oncode Institute

Websites:

<https://research.prinsesmaximacentrum.nl/en/research-groups/drost-group>

<https://www.oncode.nl/research/groups/jarno-drost-group>

<https://www.drost-lab.com>

Current Positions

Jan 2023 – present

Senior Principal Investigator
Oncode Institute

Nov 2016 – present

Group Leader (tenured in 2021)
Princess Máxima Center for Pediatric Oncology
Utrecht, the Netherlands

Education

2005 – 2012

PhD student
Netherlands Cancer Institute (lab of prof. R. Agami)
Amsterdam, the Netherlands.
Thesis: *"Identifying novel components of human tumour suppressor networks"*.

2003 – 2005

Master's degree Biomedical Sciences (*with honours*)
Free University

1999 – 2003

Amsterdam, the Netherlands
Bachelor's degree Molecular Biology
Institute of Life Sciences and Chemistry
Utrecht, the Netherlands

Past Positions

2019 – 2022

Junior Principal Investigator
Oncode Institute

2012 – 2016

Post-doctoral researcher
Hubrecht Institute (lab of prof. H. Clevers)
Utrecht, the Netherlands.

2012

Post-doctoral researcher
Netherlands Cancer Institute (lab of prof. R. Agami)
Amsterdam, the Netherlands.

Career Description

After getting my MSc degree in Biomedical Sciences (*with honours*) at the Free University in Amsterdam, I started my PhD in the lab of prof. dr. Reuven Agami at the Netherlands Cancer Institute (Amsterdam, the Netherlands). Here, I studied the genetic and epigenetic alterations that are required for the transformation of human primary cells into cancer cells (Drost & Agami, Cell 2009; Drost & Mantovani et al., Nature Cell Biology 2010; Melo & Drost et al., Molecular Cell 2012). Additionally, I was involved in projects studying the role of non-coding RNAs, mRNA stability and mRNA processing in oncogene-induced senescence and

neoplastic transformation (Voorhoeve et al., Cell 2005; Elkon, Drost & van Haaften et al., Genome Biology 2012; Jenal et al., Cell 2012; Loayza-Puch et al., Genome Biology 2013).

To pursue my interest in cancer research and stem cell biology, I undertook postdoctoral training in the lab of prof. dr. Hans Clevers at the Hubrecht Institute (Utrecht, the Netherlands). I exploited intestinal stem cells, which can be expanded in a culture dish as “organoids”, to study tumorigenesis. I set up a colorectal cancer (CRC) progression model by introducing combinations of the most commonly mutated CRC genes in human colonic organoids using CRISPR/Cas9 genome editing. I demonstrated that mutation of just four defined genes transforms healthy stem cells into invasive adenocarcinomas (Drost et al., Nature 2015). I further explored this model to dissect the genetic alterations that are required for metastasis formation (Fumagalli & Drost et al., PNAS 2017), to study mutational signatures in cancer (Drost & van Boxtel et al., Science 2017), to study signaling pathways underlying the mesenchymal CRC subtype (Fessler et al., EMBO Molecular Medicine 2016) and to evaluate the effect of RAS pathway inhibition in CRC organoids (Verissimo et al., eLIFE 2016). Moreover, I established organoid cultures from primary prostate tissue (Karthaus et al., Cell 2014) and applied this protocol to establish organoids from metastatic prostate cancer lesions and circulating tumor cells (Drost et al., Nature Protocols 2016). My postdoctoral work was awarded a prestigious Veni career grant from the Netherlands Organization for Scientific Research (NWO) and the Dr. Patrick Hanlo Award for best postdoctoral researcher of the Hubrecht Institute.

In November 2016, I started my independent research group at the Princess Máxima Center for Pediatric Oncology. My group studies the molecular alterations underpinning childhood solid tumorigenesis using representative pre-clinical model systems, including organoids and *in vivo* mouse models. My lab was the first in the world to apply organoid technology to pediatric tumors (Schutgens et al., Nature Biotechnology 2019). We have now developed culture conditions to grow organoid cultures with high efficiency from a wide spectrum of different childhood solid tumors (Calandrini et al., Nature Communications 2020; Calandrini et al., Cell Reports 2021; Meister et al., EMBO Molecular Medicine 2022; Paassen et al., Oncogene 2023). We have established organoids from >200 patient-derived tumor tissues, for which pre-clinical models were so far scarce. We have a strong interest in how derailed epigenetic gene regulation contributes to tumorigenesis (Liu, Paassen & Custers et al., Nature Communications 2023). We take a multidisciplinary approach by using our unique model systems in combination with (single-cell) multi-omics (e.g. RNAseq, ATACseq, CUT&RUN) and lineage tracing technologies to increase our understanding of the origin of these tumors and to develop new (immune-) therapeutic strategies (e.g., DeMartino, Meister & Visser et al., Nature Communications 2023).

For my research, I received several awards such as the Bas Mulder Young Investigator Award from the Dutch Cancer Society, the very prestigious ERC Starting and NWO-Vidi grants, the Dutch virtual cancer institute “Oncode” membership, and the AACR St. Baldrick’s career development award for emerging leaders in the field of pediatric oncology.

Awards and Personal Grants

2023	Oncode Institute member <i>Selected to participate as senior Oncode Investigator</i>
2023	Characterization of the immune microenvironment of rhabdomyosarcoma for the development of immunotherapy - CoFund Butterfly
2023	Oncode-Accelerator (National Growth Fund) <i>Program board member and co-lead of the Organoid work stream.</i>
2022	Project “The Virtual Child” shortlisted in the CRUK Grand Challenges competition
2021	Oncode Technology Development fund <i>“Validation of the MISC-seq technology in paediatric rhabdoid tumours”</i>
2021	NWO-Vidi grant <i>Grant part of the Netherlands Organization for Scientific Research (NWO) Talent Programme for experienced researchers performing innovative research</i>
2021	Achieved tenure at Princess Máxima Center for Pediatric Oncology
2021	Foundation Children Cancerfree (KiKa) Research Grant <i>Grant funding 4 years of research on metabolic vulnerabilities of childhood solid tumors</i>
2020	AACR St. Baldrick’s career development award <i>Inaugural award for emerging leaders in the field of pediatric oncology</i>
2019	European Research Council (ERC) Starting Grant <i>Prestigious European grant to support excellent junior Principal Investigators</i>

- 2019 Foundation Children Cancerfree (KiKa) Pilot Grant
Grant funding 1,5 years of research on relapsed Wilms tumors
- 2019 Oncode Institute member
Selected to join Oncode Institute as junior Oncode investigator
- 2018 Foundation Children Cancerfree (KiKa) Research Grant
Grant funding 4 years of research on rhabdoid tumors
- 2017 Foundation Children Cancerfree (KiKa) Research Grant
Grant funding 4 years of research on renal tumor organoid models
- 2017 Dr. Patrick Hanlo Award
Award for best post-doctoral researcher of the Hubrecht Institute
- 2016 Bas Mulder Award from the Dutch Cancer Society (KWF)
Prestigious national award for talented young researchers
- 2014 NWO-Veni grant
Grant part of the Netherlands Organization for Scientific Research (NWO) Talent Programme for talented post-doctoral researchers

PhD Supervisor

- Present Rugile Januskeviciute (expected graduation 2028)
Giulia Perticari (expected graduation 2028)
Carla Rios Arceo (expected graduation 2028)
Charlotte op 't Hoog (expected graduation 2027)
Jiayou He (expected graduation 2027)
Marjolein Kes (expected graduation 2025)
Maroussia Ganpat (expected graduation 2025)
Irene Paassen (expected graduation 2024)
Jeff DeMartino (expected graduation 2024)
- Past (graduation date)
Camilla Calandrini (25 Nov 2022), Lars Custers (15 Oct 2021), Ariadne Ooms (12 Nov 2019).

Selected Conferences and Presentations

- 2023 American Association for Cancer Research (AACR) "Advances in Kidney Cancer Research", Austin, US. **Invited speaker.**
- 2023 European Association for Cancer Research (EACR) congress, Turin, Italy. **Invited speaker.**
- 2023 SMARCB1 Hope 2023 Symposium, Saint-Paul-de-Vence, France. **Invited speaker.**
- 2023 Pediatric Grand Rounds seminar series, Memorial Sloan Kettering Cancer Center, New York, US. **Invited speaker.**
- 2023 Neurobiology and Brain Tumor Cancer Center Program seminar series, St. Jude Children's Research Hospital, Memphis, US. **Invited speaker.**
- 2022 International seminar at the Cancer Research Center of Lyon, Lyon, France. **Invited speaker (virtual).**
- 2021 SIOP (International Society of Pediatric Oncology) - RTSG (Renal Tumor Study Group) annual meeting. **Invited speaker (virtual).**
- 2021 French Society of Immunotherapy, Paris, France. **Invited speaker (virtual).**
- 2021 Organoids: Advances and Applications 2021 conference. Wellcome Genome Campus Advanced Courses and Scientific Conferences, Hinxton, UK. **Invited speaker (virtual).**
- 2021 Applications of Organoid Technology Symposium. **Invited speaker (virtual).**
- 2020 International seminar at University of Ghent, Ghent, Belgium. **Invited speaker (virtual).**
- 2020 International seminar at Institut Curie, Paris, France. **Invited speaker.**
- 2019 Oncode - CGC annual conference "Fundamental Cancer Biology", Amsterdam, the Netherlands. **Invited speaker.**
- 2019 German Cancer Consortium (DKTK) mini-retreat "Molecularly Targeted Therapy", Frankfurt, Germany. **Invited speaker.**
- 2019 Société Internationale d'Oncologie Pédiatrique (SIOP) 2019 international congress, Lyon, France. **Invited Speaker.**

- 2019 American Association for Cancer Research (AACR) “Advances in Pediatric Cancer Research”, Montreal, Canada. **Invited speaker.**
- 2019 Société Internationale d'Oncologie Pédiatrique (SIOP) Europe annual meeting, Prague, Czech Republic. **Invited speaker.**
- 2019 Comprehensive Cancer Center Developmental Biology and Solid Tumor Program, St. Jude Children's Research Hospital, Memphis, US. **Invited speaker.**
- 2018 IRI Life Sciences Colloquium series “Organoids - Life in 3D”, Humboldt University, Berlin, Germany. **Invited speaker.**
- 2018 SIOP (International Society of Pediatric Oncology) - RTSG (Renal Tumor Study Group) Committee meeting, Copenhagen, Denmark. **Invited speaker.**
- 2018 Eurolife Summer School “Molecular Mechanisms in Cancer – Translating Discoveries into Personalized Therapies” Leids University Medical Center (LUMC), Leiden, the Netherlands. **Invited speaker.**
- 2018 International Rhabdoid Tumor Meeting. Lake Louise, Canada. **Selected speaker.**
- 2018 2nd Precision Cancer Medicine (PreCanMed) project meeting and workshop, Udine, Italy. **Invited speaker.**
- 2018 International seminar at PhD program in Molecular Biomedicine, University of Trieste, Trieste, Italy. **Invited speaker.**
- 2018 ITCC-P4 International Workshop “Improving pediatric oncology drug development through preclinical research”, Amsterdam, the Netherlands. **Invited speaker.**
- 2017 National Cancer Research Institute (NCRI) Cancer Conference, Liverpool, United Kingdom. **Invited speaker.**
- 2017 Organoid Workshop, Dresden, Germany. **Invited speaker.**
- 2017 26th meeting of the KWF society for Cancer Biology, Lunteren, the Netherlands. **Selected speaker.**
- 2016 Young scientist meeting “Host-Microbial Interactions and Mucosal Immunity”, Bern, Switzerland. **Invited speaker.**
- 2016 PhD course “Cancer and Cancer Stem Cells” Karolinska Institutet, Stockholm, Sweden. **Invited speaker.**
- 2015,2016 CancerGenomiCs.nl annual scientific meeting, Utrecht, the Netherlands. **Invited speaker.**
- 2015 Symposium Berlin Institute for Medical Systems Biology, Max Delbrück Center for Molecular Medicine, Berlin, Germany. **Invited speaker.**
- 2015 EMBO|EMBL Symposium “Frontiers in Stem Cells and Cancer”, Heidelberg, Germany. **Selected speaker.**

Reviewing Activities

- Advisory Board of Review Commons, which provides a new platform offering high-quality peer-review independent of journal submission.
- Reviewer for Nature, Nature Genetics, Nature Materials, Nature Methods, Nature Protocols, Nature Communications, Cancer Cell, Cell Reports, PNAS, Nature Reviews Cancer, EMBO Reports, European Journal of Cancer.
- Reviewer for multiple national and international funding organizations including KWF, NWO, European Research Council (ERC), Medical Research Council (UK), French National Cancer Institute (France), Swiss Cancer League (Switzerland), German Research Foundation DFG (Germany), Fight Kids Cancer.

Memberships of Scientific Societies

- 2022 – The Wilms Cancer Foundation Advisory board member
- 2021 – ITCC Solid Tumor Committee
- 2019 – Société Internationale d'Oncologie Pédiatrique Europe (SIOPE) Atypical Teratoid Rhabdoid Tumor (ATRT) working group
- 2019 – SIOP Renal Tumor Study Group (RTSG) relapsed Wilms Tumor Committee
- 2018 – 2021 ITCC (Innovative Therapies for Children with Cancer in Europe) Biology group

Organisation Scientific Conferences and Workshops

- 2023 Oncode Annual Conference (Amsterdam, the Netherlands). Scientific committee member.
- 2022 The 11th International Pediatric Renal Tumour Biology Conference (Marseille, France).
Scientific committee member.
- 2022 Oncode Masterclass “Gene editing and its applications” (Utrecht, the Netherlands).
Organizer, with Ruben van Boxtel.
- 2019 Oncode Masterclass “Gene editing and its applications” (Utrecht, the Netherlands).
Organizer, with Ruben van Boxtel.

Publications

1. Liu, N.*, Paassen, I.*, Custers, L.*, Zeller, P., Teunissen, H., Ayyildiz, D., He, J., Buhl, J.L., Hoving, E.W., van Oudenaarden, A., de Wit, E.#, **Drost, J.#**. SMARCB1 loss activates patient-specific distal oncogenic enhancers in malignant rhabdoid tumors.
Nature Communications 2023 Dec 1;14(1):7762. doi: 10.1038/s41467-023-43498-3.
2. Lin, L., DeMartino, J., Wang, D., van Son, G.J.F., van der Linden, R., Begthel, H., Korving, J., Andersson-Rolf, A., van den Brink, S., Lopez-Iglesias, C., van de Wetering, W.J., Balwierz, A., Margaritis, T., van de Wetering, M., Peters, P.J., **Drost, J.**, van Es, J.H., Clevers, H. Unbiased transcription factor CRISPR screen identifies ZNF800 as master repressor of enteroendocrine differentiation.
Science 2023 Oct 27;382(6669):451-458. doi: 10.1126/science.adi2246.
3. Perotti, D., Williams, R.D., Wegert, J., Brzezinski, J., Maschietto, M., Ciceri, S., Gisselsson, D., Gadd, S., Walz, A.L., Furtwaengler, R., **Drost, J.**, Al-Saadi, R., Evageliou, N., Gooskens, S.L., Hong, A.L., Murphy, A.J., Ortiz, M.V., O’Sullivan, M.J., Mullen, E.A., van den Heuvel-Eibrink, M.M., Fernandez, C.V., Graf, N., Grundy, P.E., Geller, J.I., Dome, J.S., Perlman, E.J., Gessler, M., Huff, V., Pritchard-Jones, K. Hallmark discoveries in the biology of Wilms tumour.
Nature Reviews Urology 2023 Oct 17; doi: 10.1038/s41585-023-00824-0.
4. Schneider, P., Wander, P., Arentsen-Peters, S.T.C.J.M., Vrenken, K.S., Rockx-Brouwer, D., Adriaanse, F.R.S., Hoeve, V., Paassen, I., **Drost, J.**, Pieters, R., Stam, R.W. CRISPR-Cas9 Library Screening Identifies Novel Molecular Vulnerabilities in KMT2A-Rearranged Acute Lymphoblastic Leukemia.
International Journal of Molecular Sciences 2023 Aug 25;24(17):13207. doi: 10.3390/ijms241713207.
5. Heim, C., Moser, L.M., Kreyenberg, H., Bonig, H.B., Tonn, T., Wels, W.S., Gradhand, E., Ullrich, E., Meister, M.T., Koerkamp, M.G., Holstege, F.C.P., **Drost, J.**, Klusmann, J.H., Bader, P., Merker, M., Rettinger, E. ErbB2 (HER2)-CAR-NK-92 cells for enhanced immunotherapy of metastatic fusion-driven alveolar rhabdomyosarcoma.
Frontiers in Immunology 2023 Aug 18; 14:1228894. doi: 10.3389/fimmu.2023.1228894.
6. van Belzen, I.A.E.M., Cai, C., van Tuil, M., Badloe, S., Strengman, E., Janse, A., Verwiël, E.T.P., van der Leest, D.F.M., Kester, L., Molenaar, J.J., Meijerink, J., **Drost, J.**, Peng, W.C., Kerstens, H.H.D., Tops, B.B.J., Holstege, F.C.P., Kemmeren, P., Hehir-Kwa, J.Y. Systematic discovery of gene fusions in pediatric cancer by integrating RNA-seq and WGS.
BMC Cancer 2023 Jul 3;23(1):618. doi: 10.1186/s12885-023-11054-3.
7. DeMartino, J.*, Meister, M.T.*, Visser, L.*, Brok, M., Groot Koerkamp M.J.A., Wezenaar A.K.L., Hiemcke-Jiwa, L.S., de Souza, T., Merks, J.H.M., Rios, A.C., Holstege, F.C.P., Margaritis, T.#, **Drost, J.#**. Single-cell transcriptomics reveals immune suppression and cell states predictive of patient outcomes in rhabdomyosarcoma.
Nature Communications 2023 May 27;14(1):3074. doi: 10.1038/s41467-023-38886-8.
8. Sell, T., Klotz, C., Fischer, M.M., Astaburuaga-García, R., Krug, S., **Drost, J.**, Clevers, H., Sers, C., Morkel, M., Blüthgen, N. Oncogenic signaling is coupled to colorectal cancer cell differentiation state.
Journal of Cell Biology 2023 Jun 5;222(6):e202204001. doi: 10.1083/jcb.202204001.
9. Paassen, I., Williams, J., Rios Arceo, C., Ringnalda, F., Mercer, K.S., Buhl, J.L., Moreno, N., Federico, A., Franke, N.E., Kranendonk, M., Upadhyaya, S.A., Kerl, K., van de Wetering, M., Clevers, H., Kool, M., Hoving, E.W., Roussel, M.F.#, **Drost, J.#**. Atypical teratoid/rhabdoid tumoroids reveal subgroup-specific drug vulnerabilities.
Oncogene 2023 Apr 5. doi: 10.1038/s41388-023-02681-y.

10. Bánki, T., **Drost, J.**, van den Heuvel-Eibrink, M.M., Mavinkurve-Groothuis, A.M.C., de Krijger, R.R. Somatic, Genetic and Epigenetic Changes in Nephrogenic Rests and Their Role in the Transformation to Wilms Tumors, a Systematic Review. *Cancers* 2023 Feb 21;15(5):1363. doi: 10.3390/cancers15051363.
11. Caipa Garcia, A.L., Kucab, J.E., Al-Serori, H., Beck, R.S.S., Fischer, F., Hufnagel, M., Hartwig, A., Floeder, A., Balbo, S., Francies, H., Garnett, M., Huch, M., **Drost, J.**, Zilbauer, M., Arlt, V.M., Phillips, D.H. Metabolic Activation of Benzo[a]pyrene by Human Tissue Organoid Cultures. *International Journal of Molecular Sciences* 2022 Dec 29;24(1):606. doi: 10.3390/ijms24010606.
12. Hont, A.B., Dumont, B., Sutton, K.S., Anderson, J., Kentsis, A., **Drost, J.**, Hong, A.L., Verschuur, A. The tumor microenvironment and immune targeting therapy in pediatric renal tumors. *Pediatric Blood & Cancer* 2022 Nov 30;e30110. doi: 10.1002/pbc.30110.
13. Ludikhuizen, M.C., Gevers, S., Nguyen, N.T.B., Meerlo, M., Roudbari, S.K.S., Gulersonmez, M.C., Stigter, E.C.A., **Drost, J.**, Clevers, H., Burgering, B.M.T., Rodríguez Colman, M.J. Rewiring glucose metabolism improves 5-FU efficacy in p53-deficient/KRASG12D glycolytic colorectal tumors. *Communications Biology* 2022 Oct 31;5(1):1159. doi: 10.1038/s42003-022-04055-8.
14. van Belzen, I.A.E.M., van Tuil, M., Badloe, S., Strengman, E., Janse, A., Verwiël, E.T.P., van der Leest, D.F.M., de Vos, S., Baker-Hernandez, J., Groenendijk, A., de Krijger, R., Kerstens, H.H.D., **Drost, J.**, van den Heuvel-Eibrink, M.M., Tops, B.B.J., Holstege, F.C.P., Kemmeren, P., Hehir-Kwa, J.Y. Molecular Characterization Reveals Subclasses of 1q Gain in Intermediate Risk Wilms Tumors. *Cancers* 2022 Oct 5;14(19):4872. doi: 10.3390/cancers14194872.
15. Meister, M.T., Groot Koerkamp, M.J.A., de Souza, T., Breunis, W.B., Frazer-Mendelewska, E., Brok, M., DeMartino, J., Manders, F., Calandrini, C., Kerstens, H.H.D., Janse, A., Dolman, M.E.M., Eising, S., Langenberg, K.P.S., van Tuil, M., Knops, R.R.G., van Scheltinga, S.T., Hiemcke-Jiwa, L.S., Flucke, U., Merks, J.H.M., van Noesel, M.M., Tops, B.B.J., Hehir-Kwa, J.Y., Kemmeren, P., Molenaar, J.J., van de Wetering, M., van Boxtel, R., **Drost, J.#**, Holstege, F.C.P#. Mesenchymal tumor organoid models recapitulate rhabdomyosarcoma subtypes. *EMBO Molecular Medicine* 2022 Aug 2; e16001. doi: 10.15252/emmm.202216001.
16. Hol, J.A., Kuiper, R.P., van Dijk, F., Waanders, E., van Peer, S.E., Koudijs, M.J., Bladergroen, R., van Reijmersdal, S.V., Morgado, L.M., Blik, J., Lombardi, M.P., Hopman, S., **Drost, J.**, de Krijger, R.R., van den Heuvel-Eibrink, M.M., Jongmans, M.C.J. Prevalence of (Epi)genetic Predisposing Factors in a 5-Year Unselected National Wilms Tumor Cohort: A Comprehensive Clinical and Genomic Characterization. *Journal of Clinical Oncology* 2022 Mar 1; JCO2102510. doi: 10.1200/JCO.21.02510.
17. Kester, L., de Barbanson, B., Lyubimova, A., Chen, L-T, van der Schrier, V., Alemany, A., Mooijman, D., Peterson-Maduro, J., **Drost, J.**, de Ridder, J., van Oudenaarden, A. Integration of multiple lineage measurements from the same cell reconstructs parallel tumor evolution. *Cell Genomics* 2022 Feb 9; 2: 100096. doi: 10.1016/j.xgen.2022.100096
18. Groenendijk, A., van Tinteren, H., Jiang, Y., de Krijger, R.R., Vujanic, G.M., Godzinski, J., Rube, C., Schenk, J., Morosi, C., Pritchard-Jones, K., Al-Saadi, R., Vaidya, S.J., Verschuur, A.C., Ramirez-Villar, G.L., Graf, N., de Camargo, B., **Drost, J.**, Perotti, D., van den Heuvel-Eibrink, M.M., Brok, J., Spreafico, F., Mavinkurve-Groothuis, A.M.C. Outcome of SIOP patients with low- or intermediate-risk Wilms tumour relapsing after initial vincristine and actinomycin-D therapy only – the SIOP 93–01 and 2001 protocols. *European Journal of Cancer* 2022; doi: 10.1016/j.ejca.2021.12.014
19. Calandrini, C., **Drost, J.#**. Normal and tumor-derived organoids as a drug screening platform for tumor-specific drug vulnerabilities. *STAR Protocols* 2022; Jan 10;3(1):101079. doi: 10.1016/j.xpro.2021.101079.
20. Roy, P., van Peer, S.E., de Witte, M.M., Tytgat, G.A.M., Karim-Kos, H.E., van Grotel, M., van de Ven, C.P., Mavinkurve-Groothuis, A.M.C., Merks, J.H.M., Kuiper, R.P., Hol, J.A., Janssens, G.O.R., de Krijger, R.R., Jongmans, M.C.J., **Drost, J.**, van der Steeg, A.F.W., Littooi, A.S., Wijnen, M.H.W.A., van Tinteren, H., van den Heuvel-Eibrink, M.M. Characteristics and outcome of children with renal tumors in the Netherlands: The first five-year's experience of national centralization. *PLoS One* 2022; Jan 13;17(1):e0261729. doi: 10.1371/journal.pone.0261729.
21. van Peer, S.E., Hol, J.A., van der Steeg, A.F.W., Grotel, M.V., Tytgat, G.A.M., Mavinkurve-Groothuis, A.M.C., Janssens, G.O.R., Littooi, A.S., de Krijger, R.R., Jongmans, M.C.J., Lilien,

- M.R., **Drost, J.**, Kuiper, R.P., van Tinteren, H., Wijnen, M.H.W.A., van den Heuvel-Eibrink, M.M. Bilateral Renal Tumors in Children: The First 5 Years' Experience of National Centralization in The Netherlands and a Narrative Review of the Literature. *Journal of Clinical Medicine* 2021 Nov 26; 10(23):5558. doi: 10.3390/jcm10235558.
22. van den Boogaard, M.L., Oka, R., Hakkert, A., Schild, L., Ebus, M.E., van Gerven, M.R., Zwijnenburg, D.A., Molenaar, P., Hoyng, L.L., Dolman, M.E.M., Essing, A.H.W., Koopmans, B., Helleday, T., **Drost, J.**, van Boxtel, R., Versteeg, R., Koster, J., Molenaar, J.J. Defects in 8-oxoguanine repair pathway cause high frequency of C > A substitutions in neuroblastoma. *PNAS* 2021 Sep 7; 118(36):e2007898118. doi: 10.1073/pnas.2007898118.
23. Calandrini, C., van Hooff, S.R., Paassen, I., Ayyildiz, D., Derakhshan, S., Dolman, M.E.M., Langenberg, K.P.S., van de Ven, M., de Heus, C., Liv, N., Kool, M., de Krijger, R.R., Tytgat, G.A.M., van den Heuvel-Eibrink, M.M., Molenaar, J.J., **Drost, J.#**. Organoid-based drug screening reveals neddylation as therapeutic target for malignant rhabdoid tumors. *Cell Reports* 2021 Aug 24; 36(8):109568. doi: 10.1016/j.celrep.2021.109568.
24. Groenendijk, A., Spreafico, F., de Krijger, R.R., **Drost, J.**, Brok, J. Perotti, D., van Tinteren, H., Venkatramani, R., Godziński J., Rube, C., Geller, J.I., Graf, N., van den Heuvel-Eibrink, M.M., Mavinkurve-Groothuis, A.M.C. Prognostic Factors for Wilms Tumor Recurrence: A Review of the Literature. *Cancers (Basel)* 2021; 13(13):3142; doi: 10.3390/cancers13133142
25. Young, M.D.*, Mitchell, T.J.*, Custers, L.*, Margaritis, T., Morales-Rodriguez, F., Kwakwa, K., Khabirova, E., Kildisiute, G., Oliver, T.R.W., de Krijger, R.R., van den Heuvel-Eibrink, M.M., Comitani, F., Piapi, A., Bugallo-Blanco, E., Thevanesan, C., Burke, C., Prigmore, E., Ambridge, K., Roberts, K., Vieira Braga, F.A., Coorens, T.H.H., Del Valle, I., Wilbrey-Clark, A., Mamanova, L., Stewart, G.D., Gnanapragasam, V.J., Rampling, D., Sebire, N., Coleman, N., Hook, L., Warren, A., Haniffa, M., Kool, M., Pfister, S.M., Achermann, J.C., He, X., Barker, R.A., Shlien, A., Bayraktar, O.A., Teichmann, S., Holstege, F.C., Meyer, K.B., **Drost, J.#**, Straathof, K.#, Behjati, S.#. Single cell derived mRNA signals across human kidney tumors. *Nature Communications* 2021 Jun 23; 12(1):3896. doi: 10.1038/s41467-021-23949-5.
26. Van Ineveld, R.L., Kleinnijenhuis, M., de Blank, S., Barrera Roman, M., van Vliet, E.J., Martínez Mir, C., Johnson, H.R., Bos, F.L., Heukers, R., Chuva de Sousa Lopes, S.M., **Drost, J.**, Dekkers, J.F., Alieva, M., Wehrens, E.J., Rios, A.C. Revealing the spatio-phenotypic patterning of cells in healthy and tumor tissues with mLSR-3D and STAPL-3D. *Nature Biotechnology* 2021 Oct; doi: 10.1038/s41587-021-00926-3.
27. Calandrini, C., **Drost, J.#**. Generation of Human Kidney Tubuloids from Tissue and Urine. *Journal of Visualized Experiments* 2021 Apr 16; doi: 10.3791/62404.
28. Van Ineveld, R., Margaritis, T., Kooiman, B., Groenveld, F., Ariese, H.C.R., Lijnzaad, P., Johnson, H.R., Korving, J., Wehrens, E.J., Holstege, F.C., van Rheenen, J., **Drost, J.**, Rios, A.C., Bos, F.L. LGR6 marks multi-potent nephron progenitor cells. *Developmental Dynamics* 2021 Apr 13; doi: 10.1002/dvdy.346.
29. Custers, L.*, Khabirova, E.*, Coorens, T.H.H.*, Oliver, T.R.W., Calandrini, C., Young, M.D., Vieira Braga, F.A., Ellis, P., Mamanova, L., Segers, H., Maat, A., Kool, M., Hoving, E.W., van den Heuvel-Eibrink, M.M., Nicholson, J., Straathof, K., Hook, L., de Krijger, R.R., Trayers, C., Allinson, K., Behjati, S.#, **Drost, J.#**. Somatic mutations and single-cell transcriptomes reveal the root of malignant rhabdoid tumours. *Nature Communications* 2021 Mar 3; 12(1):1407. doi: 10.1038/s41467-021-21675-6.
30. Custers, L.*, Paassen, I.*, **Drost, J.#**. In vitro Modeling of Embryonal Tumors. *Frontiers in Cell and Developmental Biology* 2021 Feb 26; doi: 10.3389/fcell.2021.640633
31. Glykofridis, I.E., Knol, J.C., Balk, J.A., Westland, D., Pham, T.V., Piersma, S.R., Loughheed, S.M., Derakhshan, S., Veen, P., Rooimans, M.A., van Mil, S.E., Böttger, F., Poddighe, P.J., van de Beek, I., **Drost, J.**, Zwartkruis, F.J., de Menezes, R.X., Meijers-Heijboer, H.E., Houweling, A.C., Jimenez, C.R., Wolthuis, R.M. Loss of FLCN-FNIP1/2 induces a non-canonical interferon response in human renal tubular epithelial cells. *Elife* 2021 Jan 18; 10: e61630. doi: 10.7554/eLife.61630.
32. Brok, J., Mavinkurve-Groothuis, A.M.C., **Drost, J.**, Perotti, D., Geller, J.I., Walz, A.L., Georger, B., Pasqualini, C., Verschuur, A., Polanco, A., Jones, K.P., van den Heuvel-Eibrink, M., Graf, N., Spreafico, F. Unmet needs for relapsed or refractory Wilms tumour: Mapping the molecular

- features, exploring organoids and designing early phase trials - A collaborative SIOP-RTSG, COG and ITCC session at the first SIOPE meeting.
European Journal of Cancer 2020 Dec 17; 144:113-122. doi: 10.1016/j.ejca.2020.11.012.
33. Miao, Y., Ha, A., de Lau, W., Yuki, K., Santos, A.J.M., You, C., Geurts, M.H., Puschhof, J., Pleguezuelos-Manzano, C., Peng, W.C., Senlice, R., Piani, C., Buikema, J.W., Gbenedio, O.M., Vallon, M., Yuan, J., de Haan, S., Hemrika, W., Rösch, K., Dang, L.T., Baker, D., Ott, M., Depuille, P., Wu, S.M., **Drost, J.**, Nusse, R., Roose, J.P., Piehler, J., Boj, S.F., Janda, C.Y., Clevers, H., Kuo, C.J., Garcia, K.C. Next-Generation Surrogate Wnts Support Organoid Growth and Deconvolute Frizzled Pleiotropy In Vivo.
Cell Stem Cell 2020 Aug 14:S1934-5909(20)30358-1. doi: 10.1016/j.stem.2020.07.020.
 34. Van der Beek, J.N., Geller, J.I., de Krijger, R.R., Graf, N., Pritchard-Jones, K., **Drost, J.**, Murphy, D., Ray, S., Spreafico, F., Dzhuma, K., Littooi, A.S., Selle, B., Tytgat, G.A.M., van den Heuvel-Eibrink, M.M. Characteristics and Outcome of Children with Renal Cell Carcinoma: A Narrative Review.
Cancers (Basel) 2020 3; 12(7):1776. doi: 10.3390/cancers12071776.
 35. De Jel, D.V.C., Hol, J.A., Ooms, A.H.A.G., de Krijger, R.R., Jongmans, M.C.J., Littooi, A.S., **Drost, J.**, van Grotel, M., van den Heuvel-Eibrink, M.M. Paediatric metanephric tumours: a clinicopathological and molecular characterisation.
Crit. Rev. Oncol. Hematol. 2020 Jun; 150:102970. doi: 10.1016/j.critrevonc.2020.102970.
 36. Ooms, A.H.A.G.*, Calandrini, C.*, de Krijger, R.R., **Drost, J.#**. Organoid models of childhood kidney tumours.
Nature Reviews Urology 2020 Jun; 17(6):311-313. doi: 10.1038/s41585-020-0315-y.
 37. Calandrini, C.*, Schutgens, F.*, Oka, R., Margaritis, T., Candelli, T., Mathijssen, L., Ammerlaan, C., van Ineveld, R.L., Derakhshan, S., de Haan, S., Dolman, E., Lijnzaad, P., Custers, L., Begthel, H., Kerstens, H.H.D., Rookmaker, M., Verhaar, M., Tytgat, G.A.M., Kemmeren, P., de Krijger, R.R., Al-Saadi, R., Pritchard-Jones, K., Kool, M., Rios, A., van den Heuvel-Eibrink, M.M., Molenaar, J., van Boxtel, R., Holstege, F.C.P., Clevers, H., **Drost, J.#**. An organoid biobank for childhood kidney cancers that captures disease and tissue heterogeneity.
Nature Communications 2020;11(1):1310. doi: 10.1038/s41467-020-15155-6.
 38. Coorens, T.H.H., Treger, T.D., Al-Saadi, R., Moore, L., Tran, M.G.B., Mitchell, T.J., Tugnait, S., Thevanesan, C., Young, M.D., Oliver, T.R.W., Oostveen, M., Collord, G., Tarpey, P.S., Cagan, A., Hooks, Y., Brougham, M., Reynolds, B.C., Barone, G., Anderson, J., Jorgensen, M., Burke, G.A.A., Visser, J., Nicholson, J.C., Smeulders, N., Mushtaq, I., Stewart, G.D., Campbell, P.J., Wedge, D.C., Martincorena, I., Rampling, D., Hook, L., Warren, A.Y., Coleman, N., Chowdhury, T., Sebire, N., **Drost, J.**, Saeb-Parsy, K., Stratton, M.R., Straathof, K., Pritchard-Jones, K., Behjati, S. Embryonal precursors of Wilms tumor.
Science 2019 Dec 6;366(6470):1247-1251. doi: 10.1126/science.aax1323. PMID: 31806814; PMCID: PMC6914378.
 39. Bleijs, M., van de Wetering, M., Clevers, H., **Drost, J.#**. Xenograft and organoid model systems in cancer research.
EMBO Journal 2019;38(15):e101654. doi:10.15252/emboj.2019101654
 40. Schutgens, F., Rookmaaker, M.B., Margaritis, T., Rios, A., Ammerlaan, C., Jansen, J., Gijzen, L., Vormann, M., Vonk, A., Viveen, M., Yengej, F.Y., Derakhshan, S., de Winter-de Groot, K.M., Artigiani, B., van Boxtel, R., Cuppen, E., Hendrickx, A.P.A., van den Heuvel-Eibrink, M.M., Heitzer, E., Lanz, H., Beekman, J., Murk, J.L., Masereeuw, R., Holstege, F., **Drost, J.**, Verhaar, M.C., Clevers, H. Tubuloids derived from human adult kidney and urine for personalized disease modeling.
Nature Biotechnology 2019 Mar, 37 (3): 303 – 313.
 41. Kretzschmar, K., Post, Y., Bannier-Hélaouët, M., Mattiotti, A., **Drost, J.**, Basak, O., Li, V.S.W., van den Born, M., Gunst, Q.D., Versteeg, D., Kooijman, L., van der Elst, S., van Es, J.H., van Rooij, E., van den Hoff, M.J.B., Clevers, H. Profiling proliferative cells and their progeny in damaged murine hearts.
PNAS 2018 Dec 26, 115 (52): E12245 – E12254.
 42. **Drost, J.#**, Clevers, H. Organoids in cancer research.
Nature Reviews Cancer 2018 Jul, 18(7): 407-418.

43. Li, L., van Breugel, P.C., Loayza-Puch, F., Pineiro Ugalde, A., Korkmaz, G., Messika-Gold, N., Han, R., Lopes, R., Barbera, E.P., Teunissen, H., de Wit, E., Soares, R.J., Nielsen, B.S., Holmstrøm, K., Martínez-Herrera, D.J., Huarte, M., Louloui, A., **Drost, J.**, Elkon, R., Agami, R. LncRNA-OIS1 regulates DPP4 activation to modulate senescence induced by RAS. *Nucleic Acids Research* 2018 Feb 22. doi: 10.1093/nar/gky087 .
44. Fumagalli, A., Suijkerbuijk, S.J.E., Begthel, H., Beerling, E., Oost, K.C., Snippert, H.J., van Rheenen, J.#, **Drost, J.#**. A surgical orthotopic organoid transplantation approach in mice to visualize and study colorectal cancer progression. *Nature Protocols* 2018 Feb, 13 (2): 235 – 247.
45. **Drost, J.***, van Boxtel, R.*, Blokzijl, F., Mizutani, T., Sasaki, N., Sasselli, V., de Ligt, J., Behjati, S., Grolleman, J.E., van Wezel, T., Nik-Zainal, S., Kuiper, R.P., Cuppen, E., Clevers, H. Use of CRISPR-modified human stem cell organoids to study the origin of mutational signatures in cancer. *Science* 2017 Oct 13, 358 (6360): 234 – 238.
46. Fumagalli, A.*, **Drost, J.***, Suijkerbuijk, S.J.E., van Boxtel, R., de Ligt, J., Offerhaus, G.J., Begthel, H., Tan, E.H., Sansom, O.J., Cuppen, E., Clevers, H., van Rheenen, J. Genetic dissection of colorectal cancer progression by orthotopic transplantation of engineered cancer organoids. *PNAS* 2017 Mar 21, 114 (12): E2357 – E2364.
47. **Drost, J.**, Clevers, H. Translational applications of adult stem-cell derived organoids. *Development* 2017 Mar 15, 144 (6): 968 – 975.
48. Verissimo, C.S., Overmeer, R.M., Ponsioen, B., **Drost, J.**, Mertens, S., Verlaan-Klink, I., Gerwen, B.V., van der Ven, M., Wetering, M.V., Egan, D.A., Bernards, R., Clevers, H., Bos, J.L., Snippert, H.J. Targeting mutant RAS in patient-derived colorectal cancer organoids by combinatorial drug screening. *Elife* 2016 Nov 15;5. pii: e18489.
49. **Drost, J.***, Artegiani, B.*, Clevers, H. The generation of organoids for studying Wnt signaling. *Methods in Molecular Biology* 2016, 1481: 141 – 159 (Book chapter)
50. **Drost, J.**, Clevers, H. Who is in the driver's seat: tracing cancer genes using CRISPR-barcoding. *Molecular Cell* 2016 Aug 4, 63 (3): 352 – 354.
51. Fessler, E., **Drost, J.**, van Hooff, S.R., Linnekamp, J.F., Wang, X., Jansen, M., De Sousa E Melo, F., Prasetyanti, P.R., IJspeert, J.E., Franitza, M., Nürnberg, P., van Noesel, C.J., Dekker, E., Vermeulen, L., Clevers, H., Medema, J.P. TGFβ signaling directs serrated adenomas to the mesenchymal colorectal cancer subtype. *EMBO Molecular Medicine* 2016 Jul 1, 8 (7): 745 – 760.
52. **Drost, J.*#**, Karthaus, W.R.*, Gao, D., Driehuis, E., Sawyers, C.L., Chen, Y. Clevers, H. Organoid culture systems for prostate epithelial and cancer tissue. *Nature Protocols* 2016 Feb, 11 (2): 347 – 358.
53. **Drost, J.**, van Jaarsveld, R.H., Ponsioen, B., Zimmerlin, C., van Boxtel, R., Buijs, A., Sachs, N., Overmeer, R.M., Offerhaus, G.J., Begthel, H., Korving, J., van de Wetering, M., Schwank, G., Logtenberg, M., Cuppen, E., Snippert, H.J., Medema, J.P., Kops, G. J. P. L., Clevers, H. Sequential cancer mutations in cultured human intestinal stem cells. *Nature* 2015 May 7, 521 (7550), 43 – 47.
54. Karthaus, W.R., Iaquinta, P.J., **Drost, J.**, Gracanin, A., van Boxtel, R., Wongvipat, J., Dowling, C.M., Gao, D., Begthel, H., Sachs, N., Vries, R.G., Cuppen, E., Chen, Y., Sawyers, C.L., Clevers, H.C. Identification of multipotent luminal progenitor cells in human prostate organoid cultures. *Cell* 2014 Sep 25, 159 (1): 163 – 175.
55. Loayza-Puch, F., **Drost, J.**, Rooijers, K., Elkon, R., Agami, R. p53 induces transcriptional and translational programs to suppress cell proliferation and growth. *Genome Biology* 2013 Apr 17; 14 (4): R32.
56. Melo, C.A.*, **Drost, J.***, Wijchers, P.J., van de Werken, H., de Wit, E., Oude Vrielink, J.A., Elkon, R., Melo, S.A., Leveille, N., Kalluri, R., de Laat, W., Agami, R. eRNAs are required for p53-dependent enhancer activity and gene transcription. *Molecular Cell* 2013 Feb 7; 49 (3): 524 – 535.
57. Elkon, R.*, **Drost, J.***, van Haften, G.*, Jenal, M., Schrier, M., Oude Vrielink, J.A., Agami, R. E2F mediates enhanced alternative polyadenylation in proliferation. *Genome Biology* 2012 Jul 2; 13 (7): R59.

58. Jenal, M., Elkon, R., Loayza-Puch, F., van Haaften, G., Kühn, U., Menzies, F.M., Oude Vrielink, J.A., Bos, A.J., **Drost, J.**, Rooijers, K., Rubinsztein, D.C., Agami, R. The poly(A)-binding protein nuclear 1 suppresses alternative cleavage and polyadenylation sites. *Cell* 2012 Apr 27; 149 (3): 538 – 553.
59. Mantovani, F.*, **Drost, J.***, Voorhoeve, P.M., Del Sal, G., Agami, R. Gene regulation and tumor suppression by the bromodomain-containing protein BRD7. *Cell Cycle* 2010 Jul 15; 9 (14): 2777 – 2781.
60. **Drost, J.***, Mantovani, F.*, Tocco, F., Elkon, R., Comel, A., Holstege, H., Kerkhoven, R., Jonkers, J., Voorhoeve, P.M., Agami, R., Del Sal, G. BRD7 is a candidate tumour suppressor gene required for p53 function. *Nature Cell Biology* 2010 Apr; 12 (4): 380 – 389.
61. **Drost, J.**, Agami, R. Transformation locked in a loop. *Cell* 2009 Nov 13; 139 (4): 654 – 656.
62. Voorhoeve, P.M., le Sage, C., Schrier, M., Gillis, A.J., Stoop, H., Nagel, R., Liu, Y.P., van Duijse, J., **Drost, J.**, Griekspoor, A., Zlotorynski, E., Yabuta, N., De Vita, G., Nojima, H., Looijenga, L.H., Agami, R. A genetic screen implicates miRNA-372 and miRNA-373 as oncogenes in testicular germ cell tumors. *Cell* 2006 Mar 24; 124 (6):1169 – 1181.

Pre-prints

- Ganpat, M.M.P., Morales-Rodriguez, F., Pham, N., Lijnzaad, P., de Souza, T., Derakhshan, S., Fumagalli, A., Zeller, P., Balwierz, A., Ayyildiz, D., van den Heuvel-Eibrink, M.M., de Krijger, R.R., van Oudenaarden, A., Margaritis, T., Chuva de Sousa Lopes, S.M., **Drost, J#**. An engineered tumor organoid model reveals cellular identity and signaling trajectories underlying translocation RCC. *BioRxiv* 2023. doi: <https://doi.org/10.1101/2023.09.01.554626>
- Van Belzen, I.A.E.M., van Tuil, M., Badloe, S., Janse, A., Verwiël, E.T.P., Santoso, M., de Vos, S., Baker-Hernandez, J., Kerstens, H.H.D., Solleveld-Westerink, N., Meister, M.T., **Drost, J.**, van den Heuvel-Eibrink, M.M., Merks, J.H.M., Molenaar, J.J., Peng, W.C., Tops, B.B.J., Holstege, F.C.P., Kemmeren, P., Hehir-Kwa, J.Y. Complex structural variation is prevalent and highly pathogenic in pediatric solid tumors. *BioRxiv* 2023. doi: <https://doi.org/10.1101/2023.09.19.558241>
- De Munter, S., Buhl, J., De Cock, L., Van Parys, A., Daneels, W., Pascal, E., Deseins, L., Ingels, J., Goetgeluk, G., Billiet, L., Pille, M., Vandamme, N., van Dorpe, J., Offner, F., Depla, E., Tavernier, J., Kerre, T., **Drost, J.**, Vandekerckhove, B. Knocking out CD70 rescues CD70-specific nanoCAR T cells from antigen induced exhaustion. *BioRxiv* 2023. doi: <https://doi.org/10.1101/2023.01.22.523482>
- Bar-Ephraim, Y.E., Kretzschmar, K., Asra, P., De Jongh, E., Boonekamp, K.E., **Drost, J.**, van Gorp, J., Pronk, A., Smakman, N., Gan, I.J., Sebestyen, Z., Kuball, J., Vries, R.G.J., Clevers, H. Modelling cancer immunomodulation using epithelial organoid cultures. *BioRxiv* 2018. doi: <https://doi.org/10.1101/377655>

Patents

- WO2016/083613; Culture medium for epithelial stem cells and Organoids comprising stem cells.
- WO2016/083612; Culture medium for expanding breast epithelial stem cells.