

PERSONAL INFORMATION **Carolina Pia Schroeder**

WORK EXPERIENCE

- January 2008- Present **Staff member**
Department of Medical Oncology, UMC Groningen, (Netherlands)
- January 2010-January 2019 **Assistant Professor**
Department of Medical Oncology, UMC Groningen (Netherlands)
- January 2014- Present **Principle investigator**
Department of Medical Oncology, UMC Groningen (Netherlands)
- January 2019- Present **Associate Professor**
Department of Medical Oncology, UMC Groningen (Netherlands)
- January 2021- Present **Programme leader**
Cancer Research Center Groningen, (Netherlands)
Guided Treatment in optimal Selected cancer patients (GUTS)

EDUCATION AND TRAINING

- 1996 **MD**
University of Groningen, ()
- 2001- 2006 **Training Internal Medicine**
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- 2006- 2008 **Training Medical Oncology**
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- 2001 **PhD**
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New ways to optimize breast cancer treatment

ADDITIONAL INFORMATION

- Expertise** Patient care
Board certified in Internal Medicine and Medical Oncology.
Participates in all aspects of clinical care in the Department of Medical Oncology: outpatients, clinic, and consultations.
Participates in training of MD students, internists and medical oncologists.
Coordination of clinical trials, including phase I trials.
Research lines
Focus on exploration of novel rational cancer treatment options to enhance therapeutic efficacy and personalized medicine, in interdisciplinary, translational research.
1 Breast Cancer Research:
Preclinical and clinical intervention strategies directed at the breast cancer microenvironment and metastases.

Early clinical trials with novel anticancer agents

Healthy survivorship after breast cancer

2 Molecular imaging:

Visualization of tumor specific targets including cancer drug targets, particularly in breast cancer.

In this setting: active pursuing of (new) relevant drugs of (industrial) partners for preclinical and clinical studies. Principle investigator, Cancer Research Center Groningen (since 2014).

Teaching

Finalized

2009-2015 Organization of monthly clinical research meetings for Medical Oncology Groningen.

Ongoing

2007 Lecturing for medical students, residents internal medicine, residents surgery, nurses, medical oncologists in local and national meetings, subjects: treatment of breast cancer, supportive care, molecular imaging.

2008 Coaching of students (biology, medicine) during their research elective at the Department of Medical Oncology, UMCG.

2009 Tutorial groups for MD students, UMCG.

2010 Organization of 4-monthly clinical evening lecture series for medical oncologists of the Northern part of the Netherlands.

2010 Organization of lecture series on Oncology for Internal Medicine residents in training

2010 Coaching of MD students during their clinical elective at the Department of Medical Oncology

2010 'Oncology' education (part) for 3rd year MD students, UMCG, coordinator.

2014 Yearly multidisciplinary Groningen Breast Cancer Symposium, for breast cancer specialists in the Northern part of the Netherlands, chair.

2016 Lecture 'Introduction Breast Cancer', 1st year MD students (Dutch and English curriculum).

Publications English

1. Schroder CP, van der Graaf WT, Kema IP, Groenewegen A, Sleijfer DT, de Vries EG. Serotonin metabolism following platinum-based chemotherapy combined with the serotonin type-3 antagonist tropisetron. *Cancer Chemother Pharmacol.* 1995; 36: 477-482.
2. Schroder CP, Godwin AK, O'Dwyer PJ, Tew KD, Hamilton TC, Ozols RF. Glutathione and drug resistance. *Cancer Invest.* 1996; 14:158-168. Review.
3. Schroder CP, van der Graaf WTA, Willemse PHB, Vellenga E, de Leij LFMH, Mulder NH, de Vries EGE. The impact of hematopoietic growth factors on supportive care in clinical oncology: with special attention to tumor cell contamination in the stem cell harvest. *Proceedings 22nd International Symposium on Blood Transfusion, Groningen 1997.*
4. Schroder CP, de Vries EG, Mulder NH, Willemse PH, Sleijfer DT, Hospers GA, van der Graaf WT. Prevention of febrile leucopenia after chemotherapy in high-risk breast cancer patients: no significant difference between granulocyte-colony stimulating growth factor or ciprofloxacin plus amphotericin B. *J Antimicrob Chemother.* 1999; 43: 741-743.
5. Schroder CP, Kroesen BJ, de Leij LF, de Vries EG. Purging of epithelial tumor cells from peripheral blood stem cells by means of the bispecific antibody BIS-1. *Clin Cancer Res.* 2000; 6: 2521-2527.
6. Schroder CP, Wisman GB, de Jong S, van der Graaf WT, Ruiters MH, Mulder NH, de Leij LF, van der Zee AG, de Vries EG. Telomere length in breast cancer patients before and after chemotherapy with or without stem cell transplantation. *Br J Cancer.* 2001; 84: 1348-1353.
7. Schroder CP, Ruiters MH, de Jong S, Tiebosch AT, Wesseling J, Veenstra R, de Vries J, Hoekstra HJ, de Leij LF, de Vries EG. Detection of micrometastatic breast cancer by means of real time quantitative RT-PCR and immunostaining in perioperative blood samples and sentinel nodes. *Int J Cancer.* 2003; 106: 611-618.
8. Schroder CP, Timmer-Bosscha H, Wijchman JG, de Leij LF, Hollema H, Heineman MJ, de Vries EG. An in vitro model for purging of tumour cells from ovarian tissue. *Hum Reprod.* 2004; 19:1069-1075.
9. Martens HA, Schroder CP, van der Eerden PJ, Willemse PH, Posthumus MD. Severe disabling tendinopathy caused by anastrozole. *Rheumatology* 2007; 46: 1619-1621.

10. Verdonk RC, Enting RH, Janmaat M, Schroder CP, Sleijfer DT, Gietema JA. Weakness and numbness after chemotherapy for metastatic non-seminoma testis: a new neurological complication. *Acta Oncol.* 2008; 47: 1596-1598.
11. Oude Munnink TH, Nagengast WB, Brouwers AH, Schroder CP, Hospers GA, Lub-de Hooge MN, van der Wall E, van Diest PJ, de Vries EGE. Molecular imaging of breast cancer. *The Breast* 18, 2009 (S3), S66-S73.
12. Nagengast WB, Munnink TH, Dijkers EC, Hospers GA, Brouwers AH, Schroder CP, Lub-de Hooge M, de Vries EG. Multidrug resistance in oncology and beyond: from imaging of drug efflux pumps to cellular drug targets. *Methods Mol Biol.* 2010; 596: 15-31.
13. Oude Munnink TH, de Korte MA, Nagengast WB, Timmer-Bosscha H, Schroder CP, de Jong JR, van Dongen GA, Rugaard Jensen M, Quadt C, Lub-de Hooge MN, de Vries EG. 89Zr-trastuzumab PET visualizes HER2 downregulation by the HSP90 inhibitor NVP-AUY922 in a human tumour xenograft. *Eur J Cancer* 2010; 46: 678-684.
14. Dijkers EC, Oude Munnink TH, Kosterink JG, Brouwers AH, Jager PL, de Jong JR, van Dongen GA, Schroder CP, Lub-de Hooge MN, de Vries EG. Biodistribution of (89)Zr-trastuzumab and PET Imaging of HER2-positive lesions in patients with metastatic breast cancer. *Clin Pharmacol Ther.* 2010; 87: 586-592.
15. Nagengast WB, de Korte MA, Oude Munnink TH, Timmer-Bosscha H, den Dunnen WF, Hollema H, de Jong JR, Jensen MR, Quadt C, Garcia-Echeverria C, van Dongen GA, Lub-de Hooge MN, Schroder CP, de Vries EG. 89Zr-bevacizumab PET of early antiangiogenic tumor response to treatment with HSP90 inhibitor NVP-AUY922. *J Nucl Med.* 2010; 51: 761-767.
16. Oude Munnink TH, Dijkers EC, Netters SJ, Lub-de Hooge MN, Brouwers AH, Haasjes JG, Schroder CP, de Vries EG. Trastuzumab pharmacokinetics influenced by extent HER2 positive tumor load. *J Clin Oncol* 2010; 28: e355-6.
17. Kroep JR, Linn SC, Boven E, Bloemendal H, Baas J, Mandjes I, van den Bosch J, Smit WM, de Graaf H, Schroder CP, Vermeulen GJ, Hop WC, Nortier JWR. Lapatinib: clinical benefit in patients with HER2-positive advanced breast cancer. *Neth J Med* 2010; 68: 371-376.
18. Schroder CP, de Munck L, Westermann AM, Smit WM, Creemers GM, de Graaf H, Stouthard JM, van Deijk G, Erjavec Z, van Bochove A, Vader W, Willemse PH. Weekly docetaxel in metastatic breast cancer patients: no superior benefits compared to three-weekly docetaxel. *Eur J Cancer* 2011; 47: 1355-1362.
19. de Bock GH, Musters RF, Bos HJ, Schroder CP, Mourits MJE, de Jong-van den Berg LTW. Psychotropic medication during endocrine treatment for breast cancer. *Support Care Cancer*, 2012; 7: 1533-1540.
20. Terwisscha van Scheltinga, AGT, van Dam GM, Nagengast WB, Ntziachristos V, Hollema H, Herek JL, Schroder CP, Kosterink JGW, Lub-de Hooge MN, de Vries EGE. Intra-operative near-infrared fluorescence tumor imaging with VEGF and HER2 targeting antibodies. *J Nucl Med.* 2011; 52: 1778-1785.
21. Oude Munnink TH, Arjaans MEA, Vedelaar SR, Timmer-Bosscha H, Schroder CP, Hesselink JW, Walenkamp AME, Reiss M, Gregory RC, Lub-de Hooge MN, de Vries EGE. PET imaging with 89Zr labeled Transforming Growth Factor (TGF)- antibody fresolimumab. *J Nucl Med.* 2011; 52: 2001-2008.
22. van Kruchten M, Glaudemans AWJM, de Vries EFJ, Beets-Tan RGH, Schroder CP, Dierckx RA, de Vries EGE, Hospers GAP. PET imaging of estrogen receptors as a diagnostic tool for breast cancer patients presenting with a clinical dilemma. *J Nucl Med* 2012; 53: 1-9.
23. Gaykema SBM, Brouwers AH, Hovenga S, Lub-de Hooge M, de Vries EGE, Schroder CP. 89Zr-trastuzumab PET as a tool to solve a clinical dilemma in a breast cancer patient. *J Clin Oncol.* 2012; 30: e74-e75.
24. Arjaans M, Oude Munnink TH, Timmer-Bosscha H, Reiss M, Walenkamp AME, Lub-deHooge MN, de Vries EGE, Schroder CP. Transforming growth factor (TGF)- expression and activation mechanisms as potential targets for anti-tumor therapy and imaging. *Pharmacol Ther* 2012, 135: 123-132.
25. van der Bilt A, Terwisscha van Scheltinga A, Timmer-Bosscha H, Schroder CP, Pot L, Kosterink J, van der Zee A, Lub-de Hooge M, de Jong S, de Vries E, Reyners A. 89Zr-bevacizumab PET as an early biomarker for the antiangiogenic effect of everolimus treatment in an ovarian cancer xenograft model. *Clin Cancer Res* 2012, 18: 6306-6314.
26. Lammerink EAG, de Bock GH, Schroder CP, Mourits MJE. Managing menopausal symptoms in women with previous breast cancer: a case - based approach. *Maturitas* 2012, 73: 265-268.

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29. Bensch F, van Kruchten M, Lamberts LE, Schroder CP, Hospers GA, Brouwers AH, van Vugt MA, de Vries EGE. Molecular imaging for monitoring treatment response in breast cancer patients. *Eur J Pharmacol.* 2013; 717: 2-11.
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31. Arjaans M, Oude Munnink TH, Oosting SF, Terwisscha van Scheltinga AGT, Gietema JA, Garbacik ET, Timmer-Bosscha H, Lub-de Hooge MN, Schroder CP, de Vries EGE. Bevacizumab-induced vessel normalization hampers tumor uptake of antibodies. *Cancer Res.* 2013, 73: 3347-3355.
32. Van Kruchten M, de Vries EGE, Brown M, de Vries EFJ, Glaudemans AWJM, Dierckx RAJO, Schroder CP, Hospers GAP. PET imaging of oestrogen receptors in breast cancer patients. *Lancet Oncol.* 2013; 14: e465-e475.
33. Bantema-Joppe EJ, van den Heuvel ER, de Munck L, de Bock GH, Smit WGJM, Timmer PR, Dolsma WV, Jansen L, Schroder CP, Siesling S, Langendijk JA, Maduro JH. Impact of primary local treatment on the development of distant metastases or death through locoregional recurrence in young breast cancer patients. *Breast Cancer Res Treatm* 2013, 3: 577-585.
34. Arjaans M, Oosting SF, Schroder CP, de Vries EG. Bevacizumab-induced vessel normalization hampers tumor uptake of antibodies-response. *Cancer Res.* 2013; 73: 7147-7148.
35. Van den Brom RRH, Makelburg ABU, Schroder CP, de Vries EGE, Hospers GAP. Vemurafenib-induced disseminated intravascular coagulation in metastatic melanoma. *J Clin Oncol.* 2014; April 28 (Epub ahead of print).
36. Terwisscha van Scheltinga AGT, Verheijen RB, Olwill S, Audoly L, Hinner M, Schroder CP, Kosterink JGW, de Vries EGE, Lub-de Hooge MN. In vivo visualization of c-MET tumor expression and anticalin biodistribution with the c-MET anticalin 89Zr-PRS-110. *J Nucl Med.* 2014; 55: 665-671.
37. Kol A, Terwisscha van Scheltinga AGT, Timmer-Bosscha H, Lamberts LE, Bensch F, de Vries EGE, Schroder CP. HER3, serious partner in crime: therapeutic approaches and potential biomarkers for effect of HER3-targeting. *Pharmacol Ther.* 2014; 143: 1-11.
38. Terwisscha van Scheltinga AG, Lub-de Hooge MN, Abiraj K, Schroder CP, Pot L, Bossenmaier B, Thomas M, Holzwimmer G, Friess T, Kosterink JG, de Vries EG. ImmunoPET and biodistribution with human epidermal growth factor receptor 3 targeting antibody 89Zr-RG7116. *MAbs.* 2014; 6: 1051-1058.
39. Gaykema SB, de Jong JR, Perik PJ, Brouwers AH, Schroder CP, Oude Munnink TH, Bongaerts AH, de Vries EG, Lub-de Hooge MN. 111In-trastuzumab scintigraphy in HER2-positive metastatic breast cancer patients remains feasible during trastuzumab treatment. *Mol Imaging.* 2014;13:1-6.
40. Terwisscha van Scheltinga AGT, Berghuis P, Nienhuis HH, Timmer-Bosscha H, Pot L, Gaykema SBM, Lub-de Hooge MN, Kosterink JGW, de Vries EGE, Schroder CP. Visualizing dual downregulation of IGF-1R and VEGF-A by Hsp90 inhibition effect in triple negative breast cancer. *Eur J Cancer*, 2014; 50: 2508-2516.
41. Gaykema SBM, Schroder CP, Vitfell-Rasmussen J, Chua S, Oude Munnink TH, Brouwers AH, Bongaerts AHH, Akimov M, Fernandez-Ibarra C, Lub-de Hooge MN, de Vries EGE, Swanton C, Banerji U. 89Zr-trastuzumab and 89Zr-bevacizumab PET to Evaluate the effect of the heat shock protein 90 inhibitor NVP-AUY922 in metastatic breast cancer patients. *Clin Cancer Res*, 2014;20:3945-54.
42. Nienhuis HH, Gaykema SBM, Timmer-Bosscha H, Jalving M, Brouwers AH, Lub-de Hooge MN, van der Vegt B, Overmoyer B, de Vries EGE, Schroder CP. Targeting breast cancer through its microenvironment: Current status of preclinical and clinical research in finding relevant targets. *Pharmacol Ther.* 2015;147:63-79.
43. van Kruchten M, de Vries EG, Glaudemans AW, van Lanschot MC, van Faassen M, Kema IP, Brown M, Schroder CP, de Vries EF, Hospers GA. Measuring residual estrogen receptor availability during fulvestrant therapy in patients with metastatic breast cancer. *Cancer Discov.* 2015; 5: 72-81.
44. Bensch F, van Rooijen JM, Schroder CP, Reyners AK. A 21-year-old patient with a HER2-positive colorectal cancer. *Gastroenterology.* 2015; 148: 20-21.

45. Bouma G, Admiraal JM, de Vries EGE, Schroder CP, Walenkamp AME, Reyners AKL. Internet-based support programs to alleviate psychosocial and physical symptoms in cancer patients: a literature analysis. *Crit Rev Oncol Hematol*. 2015 Jan 31. pii: S1040-8428(15)00014-1.
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47. Taghizadeh N, Boezen HM, Schouten JP, Schroder CP, de Vries EGE, Vonk JM. BMI and changes in BMI and risk of cancer mortality in a large population-based cohort study. *PLoS One* 2015; 10:e0125261.
48. Nienhuis HH, Arjaans M, Timmer-Bosscha H, de Vries EGE, Schroder CP. Human stromal cells are required for an anti-breast cancer effect of zoledronic acid. *Oncotarget* 2015; 6: 24436-24447.
49. van Kruchten M, Glaudemans AWJM, de Vries EFJ, Schroder CP, de Vries EGE, Hospers GAP. Positron emission tomography of tumour [18F]fluoroestradiol uptake in patients with acquired hormonal resistant metastatic breast cancer prior to oestradiol therapy. *Eur J Nucl Med Mol Imaging* 2015; 42:1674-1681.
50. van Rooijen JM, Stutvoet T, Schroder CP, de Vries EGE. Immunotherapeutic options on the horizon in breast cancer treatment. *Pharmacol Ther* 2015, 156: 90-101.
51. Lamberts T, Menke-van der Houven van Oordt C, ter Weele E, Bensch F, Smeenk M, Voortman J, Hoekstra O, Williams S, Fine B, Maslyar D, de Jong J, Gietema J, Schroder C.P., Bongaerts A, Lub-de Hooge M, Sanabria Bohorquez, Glaudemans A, de Vries E.G.E. ImmunoPET with Anti-Mesothelin Antibody in Patients with Pancreatic and Ovarian Cancer before Anti-Mesothelin Antibody-Drug Conjugate Treatment. *Clin Cancer Res* 2016, 22: 1642-1652.
52. Gebhart G, Lamberts LE, Wimana Z, Garcia C, Emonts P, Ameye L, Stroobants S, Huizing M, Aftimos P, Tol J, Oyen WJ, Vugts DJ, Hoekstra OS, Schroder CP, Menke-van der Houven van Oordt CW, Guiot T, Brouwers AH, Awada A, de Vries EG, Flamen P. Molecular imaging as a tool to investigate heterogeneity of advanced HER2-positive breast cancer and to predict patient outcome under trastuzumab emtansine (T-DM1): the ZEPHIR trial. *Ann Oncol* 2016, 27: 619-624.
53. Arjaans M, Schroder CP, Oosting SF, Dafni U, Kleibeuker JE, de Vries EGE. VEGF pathway targeting agents, vessel normalization and tumor drug uptake: from bench to bedside. *Oncotarget* 2016, 7: 21247-21258.
54. van Es SC, Venema CM, Glaudemans AW, Lub-de Hooge MN, Elias SG, Boellaard R, Hospers GAP, Schroder CP, de Vries EGE. Translation of new molecular imaging approaches to the clinical setting: bridging the gap to implementation. *J Nucl Med* 2016, 57: 96S-104S.
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56. Venema CM, Apollonio G, Hospers GA, Schroder CP, Dierckx RA, de Vries EF, Glaudemans AW. Recommendations and Technical Aspects of 16-[18F]Fluoro-17-Estradiol PET to Image the Estrogen Receptor In Vivo: The Groningen Experience. *Clin Nucl Med*. 2016, 41: 844-851.57.
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60. de Waal EG, Glaudemans AW, Schroder CP, Vellenga E, Slart RH. Nuclear medicine imaging of multiple myeloma, particularly in the relapsed setting. *Eur J Nucl Med Mol Imaging*. 2017, 44: 332-341.
61. Koch M, de Jong JS, Glatz J, Symvoulidis P, Lamberts LE, Adams AL, Kranendonk ME, Terwisscha van Scheltinga AG, Aichler M, Jansen L, de Vries J, Lub-de Hooge MN, Schroder CP,

- Jorritsma-Smit A, Linssen MD, de Boer E, van der Vegt B, Nagengast WB, Elias SG, Oliveira S, Witkamp AJ, Mali WP, Van der Wall E, Garcia-Allende PB, van Diest PJ, de Vries EG, Walch A, van Dam GM, Ntziachristos V. Threshold Analysis and Biodistribution of Fluorescently Labeled Bevacizumab in Human Breast Cancer. *Cancer Res.* 2017, 77: 623-631.
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Projects

Memberships

Editorial board memberships, reviewing:

Editorial board

2011-2015 Dutch Society for Medical Oncology journal.

Reviewing Journal of the National Cancer Institute, European Journal of Cancer, Cancer Treatment Reviews, European Journal of Nuclear Medicine and Molecular Imaging, The Breast, Cells, Frontiers in Oncology, Scientific Reports, Supportive care in cancer

Reviewing grants

Cancer Research UK, ERC, ZonMW, Research Foundation-Flanders (Fonds Wetenschappelijk Onderzoek Vlaanderen, FWO), KWF

Memberships Dutch Society of Internal Medicine, Dutch Society of Medical Oncology, American Association for Cancer Research, American Society of Clinical Oncology

Activities, appointments, memberships for society/within civil society

Invited lectures patient organizations, other:

2013 Dutch Breast Cancer Patient Society (Borstkanker Vereniging Nederland, BVN) Symposium, Soesterberg: 'Developments with regard to metastatic breast cancer treatment'.

2014 Dutch Klinefelter patient Association Meeting, Assen: 'Male Breast Cancer'.

2014-current Medical Advisory Board member BVN

2015 Yearly Patient Congress BOOG-BVN-Pink Ribbon, Amersfoort: 'Rare types of breast cancer'

2015 Public Academy lecture (UMCG in collaboration with Northern Netherlands paper Dagblad van het Noorden, for lay people), Groningen: 'Developments with regard to breast cancer'.

2016 Patient Congress BOOG-BVN-Pink Ribbon, Amsterdam: Developments with regard to neo-adjuvant therapy.

2017 Northern Netherlands Symposium Hereditary Breast- and Ovarian Cancer, Groningen: Systemic treatment for hereditary breast- and ovarian cancer. (brcadag2017.umcg.nl)

2018 Dutch Cancer Society volunteers: 'Molecular imaging in breast cancer'.

2018-current Yearly Run for Courage event, Groningen: 'Inflammatory breast cancer'.

2019 Bedumer Winterloop fundraising run: 'Molecular imaging to see whether immunogenicity of lobular cancer can be improved'

Other Relevant Information