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Citizenship

Dual Citizenship: **USA**, **Italy**.

Education

- **University of Geneva**, Geneva, Switzerland.
  Ph.D. in Physics, in the group of Prof. N. Gisin (2002).
  Thesis title: *Nonlinear Effects in Optical Fibers*.
- **University of Trento**, Trento, Italy.
  M.Sc. in Physics, October 1996.
  Thesis title: *Structure and Vibrational Properties of Electrochromic Materials*

Present Appointment

- Assistant Professor at the *Center for Systems Biology* at MGH-Harvard University (Dir. Prof. R. Weissleder).
- Director of the In-vivo Microscopy Core at the *Center for Systems Biology* at MGH-Harvard University.
- Head Laboratory for Biooptics and Molecular Imaging at the *Center for Molecular Imaging Research* at MGH-Harvard University.

Previous Appointments

- **05/2008–12/2010** Instructor of Radiology at the Center for Systems Biology at MGH-Harvard University (*prof. R. Weissleder*)
- **09/2007–04/2008** Post-Doc researcher at the Center for Systems Biology at MGH-Harvard University (*prof. R. Weissleder*)
- **09/2005–08/2007** Post-Doc researcher at the Center for Molecular Imaging Research CMIR at MGH-Harvard University in the Lab for Biooptics and Molecular Imaging (*prof. V. Ntziachristos*)
- **07/2003–08/2005** Post-Doc at the Beckman Institute at the University of Illinois Urbana-Champaign, in the Biophotonics Imaging Laboratory.
- **05/2002–06/2003** Guest Research Fellow at Chalmers University (Sweden)- Photonics Laboratory.
- **05/2001–09/2001** Guest researcher at EXFO (Quebec, CAN)
- **03/1999–01/2002** Research Assistant at the University of Geneva, CH
- **06/1998–03/1999** Research Assistant at the University of Pittsburgh, PA.
- **03/1997–06/1998** Technical Supervisor of the Ultrafast Spectroscopy Univ. of Trento (Italy).
- **10/1996–03/1997** Technical Supervisor in the Raman Spectroscopy Laboratory Univ. of Trento (Italy).

Personal Statement

Assistant Professor in Physics at Harvard Medical School and a faculty member of the Center for Systems Biology at Massachusetts General Hospital. 25 years of experience in optical imaging and the development of several novel optical microscopic and macroscopic molecular

imaging techniques for biomedical imaging. In particular, my work has been focused on cancer imaging, functional imaging of engineered tissue, neural imaging and cardiovascular imaging. Recent work involves the development of new imaging modalities and imaging processing techniques for motion compensation for *in vivo* heart imaging, development of high throughput high-resolution imaging systems for drug-target engagement, *in vivo* and *in vitro* studies of pharmacodynamics for different drugs, longitudinal microscopy imaging study of insulitis in mice, and the development of novel high content data analysis and visualization tool. The research background in the optical imaging field includes fluorescence, fluorescence polarization and time resolved measurements, multiphoton and confocal microscopy, Raman spectroscopy, Coherent anti-Stokes Raman Scattering (CARS) imaging, optical coherence microscopy and tomography, mesoscopic imaging, optical projection tomography, and fluorescence molecular tomography in diffusive regime for whole mouse imaging.

Scientific Contributions

Author and coauthor of 178 scientific contributions. Among them, 3 Invited Review Chapters, 1 Patent, 105 articles, published in peer-reviewed international scientific journals, 69 oral presentations and poster sessions at international conferences, and 43 proceedings.

Committee Services and Activities

- ◇ Editorial Board *"Scientific Reports"* in the category Electronics, Photonics and Device Physics
- ◇ Reviewer for the following journals: *Applied Physics Letters Photonics, Biomedical Optics Express, Biotechnology Journal, Circulation: Cardiovascular Imaging, Cytometry, eLife, Frontiers in Physics, IEEE Transactions on Information Technology in BioMedicine, IEEE Transaction on Biomedical Engineering, IEEE Transactions of Instrument. and Measurements, IEEE Transactions on Med. Imaging, IEEE Journal of Biomedical and Health Informatics, Int. J. of Biochemistry, Int. J. of Biomedical Imaging, JACC: Cardiovascular Imaging, Journal of Biophotonics, J. Lightwave Technology, Journal of Mathematical Imaging and Vision, Journal of Microscopy, Journal of Molecular Imaging, Journal Nuclear Medicine, JOVE, Methods and Applications in Fluorescence, Micromachines, Molecular Imaging, Molecular Imaging and Biology, Nature Communications, Nature Methods, Nature Protocols, Optics Communications, Optics Express, Optics Letters, Photoacoustics, Photonics and Technology Letters, Physical Review A, Physical Review E, PlosOne, Review of Scientific Instruments, Scientific Reports, SLAS Discovery.*
- ◇ Chair of the "Molecular Infrared and other novel imaging modalities" session at *IEEE Engineering Medicine and Biology, Boston USA (2011).*
- ◇ Technical Program Committee of the *IEEE Biomedical and Health Informatics*, Hong Kong (2012).
- ◇ Associate Editor, Biomedical Imaging and Image Processing, *IEEE Engineering Medicine and Biology* (2012-2020).

Webpage

A copy of this curriculum vitae, a short resume, and a complete dowloadable bibliography with all the published articles and conference contributions, can be found at the following address:
https://sites.google.com/site/vinegoni/home/

Last Updated

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† equal contribution
* corresponding author

PUBLICATIONS: PATENTS

1. System and method for determination of ligand-target binding by multi-photon fluorescence anisotropy microscopy.
   C. Vinegoni*, R. Weissleder, J.M. Dubach, R. Mazitschek.
   US Patent App. 16/179,177.

PUBLICATIONS: BOOKS

1. Porous silicon microcavities.
   C. Vinegoni*, M. Cazzanelli and L. Pavesi
   in "Silicon-based Material and Devices", Vol. 2 (2001) pp. 123–92.
   Academic Press
2. Novel fluorescent probes for intraoperative cholangiography.
   C. Vinegoni*, C. Siegel, A. Mlynarchik, B.F. Sena, L.C. DeAbreu, J.L. Lima, J.L. Figueiredo.
   in "Fluorescent Imaging", Frontiers of gastrointestinal research. Vol. 31 (2013) pp. 106–112.
   Karger
3. Image processing technologies for motion compensation.
   C. Vinegoni*, S. Lee, and R. Weissleder.
   in "Imaging and visualization in the modern operating room", (2015) pp. 181–91.
   Springer

PUBLICATIONS: ARTICLES

1. Video-Rate Acquisition Fluorescence Microscopy via Generative Adversarial Networks.
   T.B. Issa, **C. Vinegoni**, A. Shaw, P. Fumene Feruglio, R. Weissleder, D. Uminsky
   "BIBE" (2020) pp. 4046.
   DOI:XX. PMID: XX. PMCID: XX
2. Extended dynamic range imaging for noise mitigation in fluorescence anisotropy imaging .
   P. Fumene Feruglio†, **C. Vinegoni***†, R. Weissleder
   "Journal Biomedical Optics" Vol. 25:(2020) pp. 0860083.
   DOI:10.1117/1.JBO.25.8.086003. PMID: 32820624. PMCID: PMC7439791
3. Fluorescence microscopy tensor imaging representations for large scale dataset analysis.
   C. Vinegoni*†, P. Fumene Feruglio†, I. G. Courties, S. Schmidt, M. Hulsmans, S. Lee, R. Wang, D. Sosnovik, M. Nahrendorf, R. Weissleder
   "Scientific Reports" Vol. 100 (2020) pp. 5632.
   DOI:10.1038/s41598-020-62233-2. PMID: XX.
4. CytoPANPortable cellular analyses for rapid point-of-care cancer diagnosis .
   J. Min, L.K. Chin, J. Oh, C. Landeros, **C. Vinegoni**, J. Lee, S.J. Lee, J.Y. Park, A.Q. Liu, C.M. Castro, H. Lee, H. Im, R. Weissleder*
   "Science Translational Medicine" Vol. 12: (2020) eaaz9746.
   DOI:DOI:10.1126/scitranslmed.aaz9746. PMID: XX. PMCID: xxx

5. Diminished Reactive Hematopoiesis and Cardiac Inflammation in a Mouse Model of Recurrent Myocardial Infarction.
S. Cremer, M. J Schloss, **C. Vinegoni***, S. Zhang, D. Rohde, P.F. Feruglio, S. Schmidt, G. Wojtkiewicz, R. Weissleder, F. Swirski, M. Nahrendorf*
"J. Am. Coll. Cardiol." Vol. 75 (2020) pp. 901.
DOI:10.1038/s41598-018-35088-x. PMID: 30425290.

6. Fluorescence anisotropy imaging in drug discovery.
C. Vinegoni*, P. Fumene Feruglio, I. Gryczynski, R. Mazitschek, and R. Weissleder
"Advanced Drug Delivery Review" Vol. 151-152 (2019) pp.262-288.
DOI:10.1016/j.addr.2018.01.019. PMID: 29410158 . PMCID: PMC6072632.

7. High dynamic range fluorescence imaging.
C. Vinegoni*, P. Fumene Feruglio, R. Weissleder
"IEEE Journal of Selected Topics in Quantum Electronics, Special Issue on Biophotonics" Vol. 25 (2019) pp. 1-13.
DOI:110.1109/JSTQE.2018.2881608. PMID: 31598059.

8. Characterization of single microvesicles in plasma from glioblastoma patients.
K. Fraser, A. Jo, J. Giedt, **C. Vinegoni***, K.S. Yang, P. Peruzzi, E.A. Chiocca, X.O. Breakfield, H. Lee, R. Weissleder*
"Neuro-Oncology" Vol. 6 (2018) pp. 606.
DOI:10.1093/neuonc/noy187. PMID: 30561734. PMCID: PMC6502493

9. The anti-tumor diterpene oridonin is a direct inhibitor of Nucleolin in cancer cells.
M. Vasaturo, R. Cotugno, L. Fiengo, **C. Vinegoni**, F. Dal Piaz*, N. De Tommasi
"Scientific Reports" Vol. 8 art.# 16735 (2018) pp. 1209-1219.
DOI:10.1038/s41598-018-35088-x. PMID: 30425290. PCMID: PMC6233161

10. Direct vascular channels connect skull bone marrow and the brain surface enabling myeloid cell migration.
F. Herisson, V. Frodermann, G. Courties, D. Rohde, Y. Sun, K. Vandoorne, G.R. Wojtkiewicz, G. Santos Masson, **C. Vinegoni**, J. Kim, D. Kim, R. Weissleder, F.K. Swirski, M.A. Moskowitz, M. Nahrendorf*
"Nature Neuroscience" Vol. 21 (2018) pp. 1209-1219.
DOI:10.1038/s41593-018-0213-2. PMID: 30150661. PMCID: PMC6148759

11. Imaging the Vascular Bone Marrow Niche During Inflammatory Stress .
K. Vandoorne, D. Rohde, H.Y. Kim, G. Courties, G.R. Wojtkiewicz, L. Honold, F.F. Hoyer, V. Frodermann, R. Nayar, F.E. Herisson FE, Y. Jung, P. Dsogre, **C. Vinegoni**, P. Caravan, R. Weissleder, D.E. Sosnovik, C.P. Lin, F.K. Swirski, M.P. Nahrendorf*
"Circulation Research" Vol. 123 (2018) pp. 415-427.
DOI:10.1016/j.addr.2018.01.019. PMID: 29980569. PMCID: PMC6202141

12. Cardiac macrophages promote diastolic dysfunction.
M. Hulsmans, H.B. Sager, J.D. Roh, V. Valero-Munoz, N.E. Houstis, Y. Iwamoto, Y. Sun, R.M. Wilson, G. Wojtkiewicz, B. Tricot, M.T. Osborne, J. Hung, **C. Vinegoni**, K. Naxerova, D.E. Sosnovik, M.R. Zile, A.D. Bradshaw, R. Liao, A. Tawakol, R. Weissleder, A. Rosenzweig, F.K. Swirski, F. Sam, M. Nahrendorf*
"JEM Journal of Experimental Medicine" Vol. 512 (2018) pp. 423-440.
DOI:10.1084/jem.20171274. PMID: 29339450 .

13. Measurement of drug-target engagement in live cells by two-photon fluorescence anisotropy imaging.
C. Vinegoni*, P. Fumene Feruglio, C. Brand, S. Lee, A.E. Nibbs, S. Stapleton, S. Shah, I. Gryczynski, R. Mazitschek, and R. Weissleder
"Nature Protocols" Vol. 12 (2017) pp. 1472-1497.
DOI:10.1038/nprot.2017.043. PMID: 28686582. PMCID: PMC5789416

14. Macrophages facilitate electrical conduction in the heart.
M. Hulsmans, S. Clauss, L. Xiao, A.D. Aguirre, K.R. King, A. Hanley, W.J. Hucker, E.M. Wlfers, G. Seemann, G. Courties, Y. Iwamoto, Y. Sun, A.J. Savol, H.B. Sager, K.J. Lavine, G.A. Fishbein, D.E. Capen, N. Da Silva, L. Miquerol, H. Wakimoto, C.E. Seidman, J.G. Seidman, R.I. Sadreyev, K. Naxerova, R.N.

Mitchell, D. Brown, P. Libby, R. Weissleder, F.K. Swirski, P. Kohl, **C. Vinegoni**, D.J. Milan, P.T. Ellinor, M. Nahrendorf*
"Cell" Vol. 169 (2017) pp. 510-222.
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15. Transparent electrophysiology microelectrodes and interconnects from metal nanomesh.
K.J Seo, Y. Qiang, I. Bilgin, S. Kar, **C. Vinegoni**, R. Weissleder, H. Fang*
"ACS Nano" Vol. 11 (2017) pp. 4365–72.
DOI:10.1021/acsnano.7b01995. PMID: 28391679.

16. Design and development of fluorescent vemurafenib analogs for in vivo imaging.
H. Mikula, S. Stapleton, R.H. Kohler, **C. Vinegoni**, R. Weissleder*
"Theranostics", Vol. 7 (2017) pp. 1257–1265.
DOI:10.7150/thno.18238. PMID: 28435463. PMCID: PMC5399591.

17. Motion characterization scheme to minimize motion artifacts in intravital microscopy.
S. Lee, G. Courties, M. Nahrendorf,R. Weissleder, and **C. Vinegoni***
"Journal of Biomedical Optics", Vol. 22 (2017) art.# 036005.
DOI:10.1117/1.JBO.22.3.036005. PMID: 28253383. PMCID: PMC5333764.

18. Quantitating drug–target engagement in single cells in vitro and in vivo.
J.M. Dubach, E. Kim, K. Yang, M. Cuccarese, R.J. Giedt, L.G. Meimetis, **C. Vinegoni***, R. Weissleder*
"Nature Chemical Biology", Vol. 13 (2017) pp. 168–173.
DOI:10.1038/nchembio.2248. PMID: 27918558.

19. Computational imaging reveals mitochondrial morphology as a biomarker of cancer phenotype and drug response.
R.J. Giedt, P. Fumene Feruglio, D. Pathania, K.S. Yang, A. Kilcoyne, **C. Vinegoni**, T.J. Mitchison, R. Weissleder*
"Scientific Reports", Vol. 6 (2016) art.# 32985.
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20. Two–photon imaging of pancreatic beta cells in real time in vivo.
S.M. Clardy, R.H. Kohler, **C. Vinegoni**, Y. Iwamoto, E.J. Keliher, R. Weissleder*
"Technology", Vol. 4 (2016) pp. 130–34.
DOI: 10.1142/S2339547816200028.

21. RNAi targeting multiple cell adhesion molecules reduces immune cell recruitment and vascular inflammation after myocardial infarction.
H.B. Sager, P. Dutta, J.E. Dahlman, M. Hulsmans, G. Courties, Y. Sun, T. Heidt, **C. Vinegoni**, A. Borodovsky, K. Fitzgerald, G.R. Wojtkiewicz, Y. Iwamoto, B. Tricot, O.F. Khan, K.J. Kauffman, Y. Xing, T.E. Shaw, P. Libby, R. Langer, R. Weissleder, F.K. Swirski, D.G. Anderson, and M. Nahrendorf*
"Science Translational Medicine", Vol. 8 (2016) art.# 342ra80.
DOI: 10.1126/SCITRANSLMED.aaf1435. PMID: 27280687. PMCID: PMC5125383.

22. Real–time high dynamic range laser scanning microscopy.
C. Vinegoni*†, C. Leon Swisher†, P. Fumene Feruglio†, R.J. Giedt, D.L. Rousso, S. Stapleton, R. Weissleder
"Nature Communications", Vol. 7 (2016) art.# 11077.
DOI: 10.1038/ncomms11077. PMID: 27032979. PMCID: PMC4821995.

23. Tyrosine kinase–mediated axial motility of basal cells revealed by intravital imaging.
J. Roy, B. Kim, E. Hill, P. Visconti, D. Krapf, **C. Vinegoni**, R. Weissleder, D. Brown, S. Breton*
"Nature Communications", Vol. 7 (2016) art.# 10666
DOI: 10.1038/ncomms10666. PMID: 26868824. PMCID: PMC4754344.

24. Two–photon fluorescence anisotropy microscopy for imaging and direct measurement of intracellular drug target engagement.
C. Vinegoni*, M. Dubach, P. Fumene Feruglio, and R. Weissleder
"Selected Topics in Quantum Electronics, IEEE", Vol. 22 (2016) art.# 6801607.
DOI: 10.1109/JSTQE.2015.2501384. PMID: 27440991. PMCID: PMC4946648.

25. Imaging the beating heart in the mouse using intravital microscopy techniques.
C. Vinegoni*, A.D. Aguirre, S. Lee, R. Weissleder
"Nature Protocol", Vol. 10 (2015) pp. 1802–19.
DOI: 10.1038/nprot.2015.119. PMID: 26492138.

26. Rapid, high efficiency isolation of pancreatic beta–cells.
S.M. Clardy, J.F. Mohan, **C. Vinegoni**, E.J. Keliher, Y. Iwamoto, C. Benoist, D. Mathis, R. Weissleder*
"Scientific Reports", Vol. 5 (2015) art.# 13681.
DOI: 10.1038/srep13681. PMID: 26330153. PMCID: PMC4557033.

27. Advances in measuring single–cell pharmacology in vivo.
C. Vinegoni*, J.M. Dubach, G.M. Thurber, M.A. Miller, R. Mazitschek, R. Weissleder
"Drug Discovery Today", Vol. 20 (2015) pp. 1087–92.
DOI: 10.1016/j.drudis.2015.05.011. PMID: 26024776. PMCID: PMC4567932.

28. New techniques for motion–artifact–free in vivo cardiac microscopy.
C. Vinegoni*†, S. Lee†, A.D. Aguirre, R. Weissleder
"Frontiers in Physiology", Vol. 6 (2015) art.# 147.
DOI: 10.3389/fphys.2015.00147. PMID: 26029116. PMCID: PMC4428079.

29. Myocardial Infarction Activates CCR2(+) Hematopoietic Stem and Progenitor Cells.
P. Dutta, H.B. Sager, K.R. Stengel, K. Naxerova, G. Courties, B. Saiez, L. Bilberstein, T. Heidt, M. Sebas, Y. Sun, G. Wojtkiewicz, P.F. Feruglio, K. King, J.N. Baker, A.M. van der Laan, A. Borodovsky, K. Fitzgerald, M. Hulsmans, F. Hoyer, Y. Iwamoto, **C. Vinegoni**, D. Brown, M. Di Carli, P. Libby, S.W. Hiebert, D.T. Scadden, F.K. Swirski, R. Weissleder, M. Nahrendorf*
"Cell Stem Cell", Vol. 16 (2015) pp. 477–87.
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30. Intravital imaging of cardiac function at the single–cell level.
A.D. Aguirre, **C. Vinegoni***, M. Sebas, R. Weissleder*
"PNAS", Vol. 111 (2014) pp. 11257–62.
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31. Steady state anisotropy two–photon microscopy resolves multiple, spectrally similar fluorophores, enabling in vivo multilabel imaging.
M. Dubach†, **C. Vinegoni***†, R. Weissleder
"Optics Letters", Vol. 39 (2014) pp. 4482–85.
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32. Chronic variable stress activates hematopoietic stem cells.
T. Heidt, H.B. Sager, G. Courties, P. Dutta, Y. Iwamoto, A. Zaltsman, C. von zur Muhlen, C. Bode, G.L. Fricchione, J. Denninger, C.P. Lin, **C. Vinegoni**, P. Libby, F.K. Swirski, R. Weissleder, R. Weissleder, M. Nahrendorf*
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33. In vivo imaging of specific drug–target binding at subcellular resolution.
M. Dubach†, **C. Vinegoni***†, R. Mazitschek, P. Fumene Feruglio, L.A. Cameron, R. Weissleder
"Nature Communications", Vol. 5 (2014) art.# 3946.
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34. Automated motion artifact removal for intravital microscopy, without a priori information .
S. Lee†, **C. Vinegoni***†, M. Sebas, R. Weissleder
"Scientific Reports", Vol. 4 (2014) art.# 4507.
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35. Advanced Motion Compensation Methods for Intravital Optical Microscopy.
C. Vinegoni*†, S. Lee†, P.F. Feruglio, R. Weissleder
"Selected Topics in Quantum Electronics, IEEE", Vol. 20 (2014) art.# 6800709.
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36. Perinatal health and translational medicine.
J.L. Figueiredo, **C. Vinegoni**, L.C. deAbreu*
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37. Sequential average segmented microscopy for high signal–to–noise ratio motion-artifact–free in vivo heart imaging.
C. Vinegoni*†, S. Lee†, P.F. Feruglio, P. Marzola, M. Nahrendorf, R. Weissleder
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38. Motion compensation using a suctioning stabilizer for intravital microscopy.
C. Vinegoni*†, S. Lee†, R. Gorbatov, R. Weissleder
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S. Lee†, **C. Vinegoni***†, P. Fumene Feruglio, L. Fexon, R. Gorbatov, M. Pivoravov, A. Sbarbati, M. Nahrendorf, R. Weissleder
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41. Improved intravital microscopy via synchronization of respiration and holder stabilization .
S. Lee†, **C. Vinegoni***†, P. Fumene Feruglio, R. Weissleder
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P. Fumene Feruglio†, **C. Vinegoni***†, L. Fexon, G. Thurber, A. Sbarbati, and R. Weissleder
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K.S. Yang, G. Budin, T. Reiner, **C. Vinegoni**, and R. Weissleder*
"Angewandte Chemie", Vol. 51 (2012) pp. 6598–6603.
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44. Optochemogenetics (OCG) Allows More Precise Control of Genetic Engineering in Mice with CreER regulators .
X. Lu, S.S. Agasti, **C. Vinegoni**, P. Waterman, R.A. Depinho, R. Weissleder*
"Bioconjugate Chemistry", Vol. 23 (2012) pp. 1045–51.
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45. Deep Tissue Optical and Optoacoustic Molecular Imaging Technologies for Pre-Clinical Research and Drug Discovery..
D. Razansky, N. Deliolanis, **C. Vinegoni**, and V. Ntziachristos*
"Current Pharmaceutical Biotechnology", Vol. 13 (2012) pp. 504–22.
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"Nature", Vol. 487 (2012) pp. 325–29.
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W.W. Lee, B. Marinelli, A.M. van der Laan, B.F. Sena, R. Gorbatov, F. Leuschner, P. Dutta, Y. Iwamoto, T. Ueno, M.P. Begieneman, H.W. Niessen, J.J. Piek, **C. Vinegoni**, M.J. Pittet, F.K. Swirski, A. Tawakol, M. Di Carli, R. Weissleder, M. Nahrendorf*
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48. Imaging Therapeutic PARP Inhibition In Vivo through Bioorthogonally Developed Companion Imaging Agents .
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