



SHEENA N. SMITH

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Comprehensive list of publications:

<https://scholar.google.com/citations?user=EgmZXUsAAAAJ>

Comprehensive list of patents can be found here:

<https://patents.google.com/?inventor=Sheena+Smith>

SHORT CURRICULUM VITAE

Sheena N. Smith, Ph.D., is an entrepreneur and scientist with expert knowledge of gene and cell therapy, biochemical immunology, and directed evolution bringing forward ground-breaking precision medicines. She is a co-inventor of platform technologies that have contributed to the technical foundation for multiple biotech and pharma start-ups in the US and Europe, including the “SHREAD technology” for precision gene delivery (Vector BioPharma, est. 2021) and a semi-rational design approach to T cell receptor engineering (ImmuVen, est. 2007, acquired by AbbVie in 2014). Dr. Smith has over 15 years of experience in biomedical research, has authored a dozen peer-reviewed publications (H-index 12), and holds numerous patents across cell and gene therapy. She has significant experience in building and managing a biotech start-up, and provides a broad skillset in scientific leadership, alliance management, program/portfolio management and business development.

KEY EXPERIENCE

Head of Program Management & Member of Executive Board, Vector BioPharma AG, Basel, Switzerland.

2021.09 – 2024.06

- Leads and manages company’s scientific leadership team in a matrix organizational structure (up to 10 director level positions, ~40 total indirect reports; reporting to the CEO).
- Chief expert on Vector BioPharma’s technology, governing body in science and portfolio, external face on science and technology, and member of the company’s executive management team.
- Defines company’s scientific vision, objectives, strategy, and portfolio with senior leadership and directs research activities across discovery, preclinical and CMC areas.
- Leads fundraising and business development discussions with investors and partners.
- Regularly interacts directly with the Board of Directors and Scientific Advisory Board.
- Co-developed foundational technology for company and built company from founding to a 50+ person organization in its first year.

Senior Research Staff & Postdoctoral Fellow, Department of Biochemistry, University of Zürich, Zürich, Switzerland

2015.04 – 2021.08

- Led translational development of SHREAD technology from academic setting (as post-doc) to industrial setting at Vector BioPharma (as senior researcher and beyond) under the mentorship of Andreas Plückthun.
- Postdoctoral research project (2015-2018) independently funded via a highly competitive Ruth L. Kirschstein Post-Doctoral National Research Service Award (NRSA) through the USA National Institutes of Health (NIH F32 CA189372).
- Direct supervision of 7 M.S. thesis projects and numerous short to mid-term research projects.
- Responsible for grant writing, project design, experimentation, and reporting of results for various projects in the fields of gene therapy, protein engineering and protein biochemistry *both in vitro* and in animal models.
- Led and managed the team responsible for delivering various projects including SNF research project NRP 78 (COVID-19), including design of experimental aims, coordination of sub-projects and technologies, communication of project objectives and timeline to team members and collaborators, assignment of project milestones and tasks to team members, and maintenance of reports and other project documentation.

Graduate Research Staff, Department of Biochemistry, University of Illinois at Urbana-Champaign, Urbana, IL, USA

2009.12 – 2014.08

- Lead inventor of a semi-rational design platform that allows T cell receptors to be engineered entirely *in vitro* against cancer biomarker, and several T cell receptors as candidates for immunotherapies under the PhD thesis mentorship of David Kranz.
- Obtained numerous patent filings across three patent families with IP licensed and commercialized by ImmuVen (est. 2007) and eventually acquired by AbbVie in 2014.

EDUCATION

- **PhD in Biochemistry, 2014**, University of Illinois at Urbana-Champaign, Urbana, IL, USA
- **Certificates in Business Administration and Entrepreneurship & Management, 2013**, College of Business, University of Illinois at Urbana-Champaign, Urbana, IL, USA

Last Update: 24. July 2024

- **BS in Molecular & Cellular Biology with a minor in Chemistry, 2007**, *Cum laude with distinction* (Cumulative GPA 3.9/4.0), University of Illinois at Urbana-Champaign, Urbana, IL, USA

SELECTED PUBLICATIONS

Comprehensive list of publications can be found here: <https://scholar.google.com/citations?user=EgmZXUsAAAAJ>

Current H-Index: 12

- [1] Freitag, P.C.; Kaulfuss, M.; Flühler, L.; Mietz, J.; Weiss, F.; Brücher, D.; Kolibius, J.; Hartmann, K.P.; **Smith, S.N.**; Münz, C.; Chijioke, O.; Plückthun, A. Targeted adenovirus-mediated transduction of human T cells *in vitro* and *in vivo*. *Mol Ther Methods Clin Dev* (2023), 29, 120-132.
- [2] Schubert, R.*; Bae, T.*; Simic, B.*; **Smith, S.N.***; Park, S.; Nagy-Davidescu, G.; Gradinaru, V.; Plückthun, A.; Hur, J.K. (***co-first authors**). CRISPR-clear imaging of melanin-rich B16-derived solid tumors. *Commun Biology* 6, 370 (2023).
- [3] Kirchhammer, N.; Trefny, M.P.; Natoli, M.; Brücher, D.; **Smith, S.N.**; *et al.* NK cells with tissue-resident traits shape response to immunotherapy by inducing adaptive antitumor immunity, *Sci Trans Med* (2022), 14(653), eabm9043.
- [4] **Smith, S.N.***; Schubert, R.; Brücher, D.; Simic, B.; Schmid, M.; Kirk, N.; Freitag, P.; Gradinaru, V.; Plückthun, A.* (***co-corresponding authors**). The SHREAD gene therapy platform for paracrine delivery improves tumor localization and intratumoral effects of a clinical antibody. *Proc Natl Acad Sci U S A* (2021), 118(21), e2017925118.
- [5] Brücher, D.; Kirchhammer, N.; **Smith, S.N.**; Schumacher, J.; Schumacher, N.; Kolibius, J.; Freitag, P.C.; Schmid, M.; Weiss, F.; Keller, C.; Grove, M. Geber, U.; Zippelius, A.; Plückthun, A. iMATCH: an integrated modular assembly system for therapeutic combination high-capacity adenovirus gene therapy. *Mol Ther Methods Clin Dev* (2021), 20, 572-586.
- [6] Brücher, D.; Frank, V.; **Smith, S.N.***; Heck, A.J.R.*; Plückthun, A.* (***co-corresponding authors**). Malignant tissues produce divergent antibody glycosylation of relevance for cancer gene therapy effectiveness. *MAbs* (2020), 12(1), 1792084.
- [7] Harris, D.T.; Hager, M.V.; **Smith, S.N.**; Cai, Q.; Stone, J.D.; Kruger, P.; Lever, M.; Dushek, O.; Schmitt, T.M.; Greenberg, P.D.; Kranz, D.M. Comparison of T cell activities mediated by human TCRs and CARs that use the same recognition domains. *J Immunol* (2018), 200(3) 1088-1100.
- [8] Harris, D.T.; Singh, N.K.; Cai, Q.; **Smith, S.N.**; Vander Kooi, C.W.; Procko, E.; Kranz, D.M.; Baker, B.M. An Engineered Switch in T Cell Receptor Specificity Leads to an Unusual but Functional Binding Geometry. *Structure* (2016), 24(7), 1142-54.
- [9] **Smith, S.N.**; Harris, D.T.; Kranz, D.M. T Cell Receptor Engineering and Analysis Using the Yeast Display Platform. *Methods Mol Biol* (2015), 1319, 95-141.
- [10] **Smith, S.N.**; Wang, Y.; Baylon, J.L.; Singh, N.K.; Baker, B.M.; Tajkhorshid, E.; Kranz, D.M. Changing the peptide specificity of a human T cell receptor by directed evolution. *Nat Commun* (2014), 5, 5223.
- [11] **Smith, S.N.**; Sommermeyer, D.; Piepenbrink, K.H.; Blevins, S.J.; Bernhard, H.; Uckert, W.; Baker, B.M.; Kranz, D.M. Plasticity in the contribution of T cell receptor variable region residues to binding of peptide-HLA-A2 complexes. *J Mol Biol* (2013), 425(22), 4496-507.
- [12] Sasser, T.; Qiu, Q.; Karunakaran, S.; Padolina, M.; Reyes, A.; Flood, B.; **Smith, S.**; Gonzales, C.; Fratti, R.A.; Yeast lipin 1 orthologue pah1p regulates vacuole homeostasis and membrane fusion. *J Biol Chem* (2012), 287(3), 2221-36.

SELECTED PATENTS

Comprehensive list of patents can be found here: <https://patents.google.com/?inventor=Sheena+Smith>

- [1] Freitag, P.C.; Plückthun, A.; Kaulfuss, M.; Chijioke, O.; Cadilha, B.L.; Kirchhammer, N.; Atsaves, V.; **Smith, S.N.** Adenoviral mediated targeting of activated immune cells. World Intellectual Property Organization (WIPO) Patent Application WO2023180527A1; Priority 2022-03-25, Filed 2023-03-24, Published 2023-09-28.
- [2] Freitag, P.C.; Brandl, F.; Brücher, D.; Weiss, F.; **Smith, S.N.**; Dreier, B.; Plückthun, A. Adenoviral vectors World Intellectual Property Organization (WIPO) Patent Application WO2023117987A1; Priority 2021-12-21, Filed 2022-12-19, Published 2023-06-29.
- [3] **Smith, S.N.**; Kranz, D.M. Engineering T cell receptors; US Patent US11384133B; Priority 2012-07-27, Filed 2018-04-13, Granted 2022-07-12, Published 2022-07-12.
- [4] **Smith, S.N.**; Harris, D.T.; Kranz, D.M. Engineered high-affinity human T cell receptors; US Patent US10023625B2; Priority 2013-11-22, Filed 2014-11-21, Granted 2018-07-17, Published 2018-07-17.

SELECTED RESEARCH FEATURES

- "Vector Biopharma kicks off with CHF30m Series A financing," European Biotechnology, 16 August 2022, <https://european-biotechnology.com/up-to-date/latest-news/news/vector-biopharma-kicks-of-with-chf30m-series-a-financing.html>

- New Technology Makes Tumor Eliminate Itself,” University of Zürich News Release, 18 May 2021, <https://www.news.uzh.ch/en/articles/2021/shred.html>
- “Trojanisches Pferd gegen Brustkrebs,” by Judith Hochstrasser, Horizons: The Swiss Research Magazine, No. 124 (p. 6-7), March 2020 issue, <https://www.horizonte-magazin.ch/2020/03/05/leuchtgewitter-verraet-trojanisches-pferd/>
- “Scientists engineer human T cell receptors against cancer antigens,” University of Illinois School of Molecular & Cellular Biology News, 07 November 2014, <https://mcb.illinois.edu/news/2014-11-07/scientists-engineer-human-t-cell-receptors-against-cancer-antigens>

PRESENTATIONS

- [1] **Smith, S.N.** Precision gene delivery by SHREAD VLPs for enhanced safety and efficacy *in vivo*. **Invited talk.** ELRIG UK Advancements in Cell & Gene Therapy: New Therapeutic Horizons, SEP-2023, Biozentrum, University of Basel, Basel, Switzerland.
- [2] Sago, C.; **Smith, S.N.**; Fenton, O.; Bot, A.; Panel Discussion: War of the Payloads – Addressing the Advantages & Disadvantages of Transient VS Direct Integration. **Invited Panelist.** In Vivo Engineering of Therapeutic Cells Summit, JUL-2023, Boston, MA, USA
- [3] **Smith, S.N.** Precision Gene Delivery by SHREAD VLPs for Enhanced Safety and Efficacy *In Vivo*. **Invited talk.** In Vivo Engineering of Therapeutic Cells Summit, JUL-2023, Boston, MA, USA
- [4] **Smith, S.N.** Roundtable Session on Biomedical Entrepreneurship. **Invited Panelist.** NCI Division of Cancer Epidemiology and Genetics (DCEG) Fellows’ Symposium, MAY-2023, Bethesda, MD, USA (virtual format).
- [5] Kensy, F.; **Smith, S.N.** Making your first year count. **Invited Speaker.** Benchling Build Your Bench, Europe: How to Start & Scale a Biotech Company, MAY-2022, Virtual Symposium.
- [6] **Smith, S.N.** The SHREAD gene therapy platform: Shielded, retargeted adenovirus 5 for the in situ production of cancer therapeutics. **Selected talk.** 14th International Adenovirus Meeting, MAY-2021, Toledo, Spain (virtual format).
- [7] Simic, B.; Hartmann, K.P.; Weiss, F.; Natter, A.; Baren, N.; Singh Badwal, J.; Chernyavska, M.; Anton-Joseph, S.; **Smith, S.N.**; Plückthun, A. Development of a targeted, adenoviral gene therapy platform for optimized delivery of SARS-CoV-2 interventions to the lung. **Poster.** Swiss National Science Foundation National Research Project 78 Programme Conference, APR-2021, Bern, Switzerland (virtual format).
- [8] **Smith, S.N.** SHielded, RETargeted ADenovirus (SHREAD) for the paracrine delivery of therapeutic biologics. **Virtual talk.** Joint Cancer Meeting, University of Zurich Cancer Network Zurich, NOV-2020, Zürich, Switzerland.
- [9] **Smith, S.N.** In situ production of therapeutic antibodies. **Invited talk.** CHAINS Dutch Chemistry Conference, DEC-2019, Veldhoven, Netherlands
- [10] **Smith, S.N.**; Schubert, R.; Simic, B.; Brücher, D.; Schmid, M.; Gradinaru, V.; Plückthun, A. Paracrine delivery of therapeutic biologics for cancer. **Selected talk.** The European Society of Gene and Cell Therapy (ESGCT) 27th Annual Congress, OCT-2019, Barcelona, Spain
- [11] **Smith, S.N.** Paracrine delivery of therapeutic biologics. **Invited talk.** Lund University Cancer Center Distinguished Seminar, JUN-2019, Lund University Cancer Center and Medicon Village; Lund, Sweden
- [12] Schubert, R.; **Smith, S.N.***; Simic, B.*; Bae, T.; Brücher, D.; Hur, J.; Gradinaru, V.; Plückthun, A. (***co-presenting authors**) Biodistribution and efficacy analyses of a targeted adenoviral therapy via CLARITY and deep imaging of intact tumors. **Poster.** Swiss Light-Sheet Microscopy Workshop, APR-2019, Zürich, Switzerland
- [13] **Smith, S.N.**; Kirchhammer, N.; Ignatenco, A.; Jans, S.; Brücher, D.; Simic, B.; Kashyap, A.; Dreier, B.; Schmid, M.; Freitag, P.; Hartmann, K.P.; Zippelius, A.; Plückthun, A. How non-oncolytic, engineered adenoviruses can be exploited for in vivo delivery of therapeutic antibodies, cell-based therapies and beyond. **Selected talk.** 13th International Adenovirus Meeting, SEP-2018, San José Vista Hermosa, Mexico
- [14] **Smith, S.N.**; Brücher, D.; Ignatenco, A.; Jans, S.; Dreier, B.; Schmid, M.; Plückthun, A. Targeted stealth adenoviruses for delivery of cancer drug combinations from within enemy lines. **Invited talk.** Department of Immunotechnology Seminar, AUG-2018, Lund, Sweden
- [15] **Smith, S.N.**; Brücher, D.; Ignatenco, A.; Jans, S.; Dreier, B.; Schmid, M.; Plückthun, A. Targeted stealth adenoviruses for delivery of cancer drug combinations from within enemy lines. **Selected E-poster.** Merck Curious 2018 Future Insight Conference, JUL-2018, Darmstadt, Germany
- [16] **Smith, S.N.**; Targeted stealth adenovirus as a ‘Trojan Horse’ for delivery of cancer therapies. **Invited talk.** Jacobs School of Engineering Special Seminar Series, JUN-2018, University of California San Diego, La Jolla, CA, USA
- [17] **Smith, S.N.**; DARPins: Designed binding proteins for research, diagnostics, and therapy. **Guest talk.** Viviana Gradinaru Group Seminar, JUN-2018, California Institute of Technology, Pasadena, CA, USA
- [18] **Smith, S.N.**; Ignatenco, A.; Jans, S.; Schmid, M.; Dreier, B.; Brücher, D.; Freitag, P.; Plückthun, A. Targeted ‘stealth’ adenovirus for delivery of cell-based therapies. **Poster.** Keystone Symposia on Molecular and Cellular Biology – Emerging Cellular Therapies: T Cells and Beyond, FEB-2018, Keystone, CO, USA
- [19] **Smith, S.N.**; Brücher, D.; Jans, S.; Dreier, B.; Schmid, M.; Plückthun, A. Targeted stealth adenovirus as a ‘Trojan horse’ for delivery of cancer therapies. **Poster.** The European Society of Gene and Cell Therapy (ESGCT) XXV Anniversary Congress, OCT-2017, Berlin, Germany

- [20] **Smith, S.N.** Targeted adenoviruses for the cell-specific delivery of cancer therapies. **Presentation.** Biochemistry Institute Departmental Progress Report, APR-2017, University of Zurich, Zurich, Switzerland
- [21] **Smith, S.N.**; Jans, S.; Brücher, D.; Dreier, B.; Schmid, M.; Plückthun, A. Targeted stealth adenoviruses for the cell-specific delivery of cancer immunotherapies. **Poster.** Keystone Symposia on Molecular and Cellular Biology – Cancer Immunology and Immunotherapy: Taking a Place in Mainstream Oncology, MAR-2017, Whistler, BC, Canada
- [22] **Smith, S.N.**; Brücher, D.; Jans, S.; Dreier, B.; Schmid, M.; Plückthun, A. Targeted ‘stealth’ adenoviruses for the cell-specific delivery of cancer therapies. **Poster.** 13th Charles Rodolphe Brupbacher Symposium: Breakthroughs in Cancer Research and Therapy, FEB-2017, University of Zurich, Zurich, Switzerland
- [23] **Smith, S.N.**; Brücher, D. Targeted adenoviral delivery of monoclonal antibody combination therapies to the tumor microenvironment. **Guest talk.** Albert Heck Group Seminar, NOV-2016, University of Utrecht, Utrecht, Netherlands
- [24] **Smith, S.N.**; Dreier, B.; Schmid, M.; Brücher, D.; Plückthun, A. Targeted adenoviral delivery of protein-based therapeutics to the tumor microenvironment. **Poster.** University of Zürich Life Sciences Post Doc Day, OCT-2016, Schloss Au, Wädenswil, Switzerland
- [25] **Smith, S.N.**; Dreier, B.; Schmid, M.; Brücher, D.; Plückthun, A. Targeted adenoviral delivery of protein-based therapeutics to the tumor microenvironment. **Poster.** ISREC-SCCL Inaugural Symposium: Horizons of Cancer Biology and Therapy, SEP-2016, Lausanne, Switzerland
- [26] **Smith, S.N.**; Dreier, B.; Schmid, M.; Brücher, D.; Plückthun, A. Targeted adenoviral delivery of protein-based therapeutics to the tumor microenvironment. **Selected talk and poster.** Keystone Symposia on Molecular and Cellular Biology – Antibodies as Drugs Conference, MAR-2016, Whistler, BC, Canada
- [27] **Smith, S.N.**; Sommermeyer, D.; Schmitt, T.M.; Schendel, D.; Bernhard, H.; Piepenbrink, K.H.; Baker, B.M.; Blankenstein, T.; Uckert, W.; Greenberg, P.D.; Kranz, D.M. Engineering high-affinity human single-chain T cell receptors against cancer antigens. **Poster.** SACNAS National Conference: Strengthening the Nation Through Diversity, Innovation and Leadership in STEM, OCT-2013, San Antonio, TX, USA
- [28] **Smith, S.N.**; Sommermeyer, D.; Schmitt, T.M.; Schendel, D.; Bernhard, H.; Piepenbrink, K.H.; Baker, B.M.; Blankenstein, T.; Uckert, W.; Greenberg, P.D.; Kranz, D.M. Engineering designer T cell receptors through the use of single-chain T cell receptor scaffolds. **Selected talk and poster.** Career Development Conference at the Chemistry-Biology Interface, JUN-2013, Urbana, IL, USA
- [29] **Smith, S.N.**; Sommermeyer, D.; Schmitt, T.M.; Schendel, D.; Bernhard, H.; Piepenbrink, K.H.; Baker, B.M.; Blankenstein, T.; Uckert, W.; Greenberg, P.D.; Kranz, D.M. Engineering designer T cell receptors through the use of single-chain T cell receptor scaffolds. **Selected talk and poster.** Keystone Symposia on Molecular and Cellular Biology - Cancer Immunology and Immunotherapy Conference, JAN-2013, Vancouver, BC, Canada
- [30] **Smith, S.N.**; Engineering designer T cell receptors through the use of single-chain T cell receptor scaffolds. **Presentation.** Biochemistry Department Graduate Seminars, University of Illinois, NOV-2012, Urbana, IL, USA
- [31] **Smith, S.N.**; Sommermeyer, D.; Schendel, D.; Bernhard, H.; Piepenbrink, K.H.; Baker, B.M.; Blankenstein, T.; Uckert, W.; Kranz, D.M. Engineering high-affinity human single-chain T cell receptors against MART1 cancer antigens. **Poster.** University of Illinois Urbana-Champaign Cell and Molecular Biology Annual Research Symposium, NOV-2012, Urbana, IL, USA
- [32] **Smith, S.N.**; Sommermeyer, D.; Schendel, D.; Bernhard, H.; Piepenbrink, K.H.; Baker, B.M.; Blankenstein, T.; Uckert, W.; Kranz, D.M. Engineering high-affinity human single-chain T cell receptors against MART1 cancer antigens. **Poster.** SACNAS National Conference: Science, Technology, and Diversity for a Healthy World, OCT-2012, Seattle, WA, USA
- [33] **Smith, S.N.** Engineering high affinity T cell receptors against cancer antigens. **Selected talk.** 8th Annual Chemistry-Biology Interface Training Grant Symposium, University of Illinois, SEP-2012, Urbana, IL, USA
- [34] **Smith, S.N.** Engineering human T cell receptor scaffolds. **Invited talk.** Computational Structural Biology and Molecular Biophysics Meeting, University of Illinois, JUL- 2012
- [35] **Smith, S.N.**; Sommermeyer, D.; Schendel, D.; Bernhard, H.; Piepenbrink, K.H.; Baker, B.M.; Blankenstein, T.; Uckert, W.; Kranz, D.M. Engineering high-affinity human single-chain T cell receptors against MART1 cancer antigens. **Poster.** 8th PEGS Conference: The Essential Protein Engineering Summit, APR-2012, Boston, MA, USA
- [36] **Smith, S.N.** Engineering and characterization of human single-chain T cell receptors. **Presentation.** Biochemistry Department Graduate Seminar. University of Illinois, APR-2012, Urbana, IL, USA.