Stanford

Capucine Van Rechem

Bio

BIO

Dr. Van Rechem received her education at the University of Lyon I, France (BS in Cellular Biology and Physiology, Genetics) and at the University of Lille II, France (MS in Biological Sciences, PhD in Biochemistry and Molecular Biology). She came to the United States for her post-doctoral training at the Massachusetts General Hospital Cancer Center and Harvard Medical School Department of Medicine, where she became an Assistant in Genetics and Instructor of Medicine in 2015. In 2017, Dr. Van Rechem was appointed as an Assistant Professor in Pathology at Stanford University.

Dr. Van Rechem is interested in the molecular impact of chromatin modifiers on disease development, with an emphasis on cancer. Her laboratory undertakes a cell-cycle specific angle to explore specific functions such as gene expression and replication timing. They also explore unconventional direct roles for these factors in the cytoplasm, with a focus on protein synthesis. Their ultimate goal is to provide needed insights into new targeted therapies.

ACADEMIC APPOINTMENTS

- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Breakthrough Award, Department of Defense Breast Cancer Research Program (2023-2026)
- Research Scholar, American Cancer Society (2023-2026)
- Jacob Churg Award, Stanford Department of Pathology (2022)
- Emerging Scientist Award, Children's Cancer Research Fund (2021-2022)
- Under One Umbrella-Women’s Cancer Innovation Award, Stanford Women’s Cancer Center and Stanford Cancer Institute (2021-2022)
- Distinguished Scientist Award, The Sontag Foundation (2019-2023)
- Scientific Scholar Award, Marsha Rivkin Center for Ovarian Cancer Research (2014-2015)
- Postdoctoral Fellowship, MGH ECOR Fund for Medical Discovery (2014-2015)
- Predoctoral Fellowship, Association pour la Recherche sur le Cancer (2008-2009)
- Predoctoral Fellowship, French Ministry of Research and Technology (2005-2008)

PROFESSIONAL EDUCATION

- Postdoctoral Fellow, Massachusetts General Hospital Cancer Center and Harvard Medical School Department of Medicine , Epigenetics and Cancer (2017)
- Ph.D., University of Lille II, France , Biochemistry and Molecular Biology (2009)
- M.S., University of Lille II, France , Biological Science (2005)
- B.S., University of Lyon I, France , Cellular Biology and Physiology, Genetics (2003)

LINKS

- Van Rechem Lab: http://www.vanrechemlab.com

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Chromatin regulators are highly altered in diseases. Of interest, these proteins are easily targetable by drugs. Furthermore, the plasticity of epigenetic events makes them a powerful target for new therapeutic strategies and reversion of disease phenotype. Histone and DNA modifications influence many processes including transcription, replication, genomic stability and cell division, which are altered in diseases. Therefore, understanding the molecular basis of chromatin modifiers in both normal and pathological cells could help us frame new potential biomarkers and targeted therapies.

My long-term interest lies in understanding the impact chromatin modifiers have on disease development and progression so that more optimal therapeutic opportunities can be achieved. My laboratory explores the direct molecular impact of chromatin-modifying enzymes during cell cycle progression, and characterizes the unappreciated and unconventional roles that these chromatin factors have on cytoplasmic function such as protein synthesis. By gaining molecular understanding into the mechanism of action of chromatin modifiers in normal and pathological cells, we will improve our basic knowledge and provide needed insights into new potential targeted therapies in diseases.

Teaching

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Luis Hernandez, Magdalena Murray

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Cancer Biology (Phd Program)

Publications

PUBLICATIONS

- **ACTB methylation regulates SMARCA4 genomic occupancy to promote translation and reduce adhesion in colorectal cancer cells.** *Genome research*
  Abaev-Schneiderman, E., Nguyen, L., Shalev, R., Biton, T. E., Chopra, A., Jagadeesan, G., Sevilla-Sanchez, D., Tickotsky Moskovitz, N., Levin, L., Feldman, M., Van Rechem, C., Levy, D.
  2026
- **Oncogenic SF3B1 mutations alter the splicing of mRNA noncoding regions to induce a novel therapeutic vulnerability.** *Blood*
  Sekrecki, M., Sekrecka, A., Lattupally, R. R., Le, K., Jin, X., Mozes, C., Dwyer, B. G., Zhuang, Z., Romero, B. A., Pineda, J. M., Cao, X., Nguyen, L., Chen, et al
  2026

- **Multi-omics approaches reveal that diffuse midline gliomas present altered DNA replication and are susceptible to replication stress therapy.** *Genome biology*
  Hains, A. E., Chetal, K., Nakatani, T., Marques, J. G., Ettinger, A., Junior, C. A., Gonzalez-Sandoval, A., Pillai, R., Filbin, M. G., Torres-Padilla, M. E., Sadreyev, R. I., Van Rechem, C.
  2024; 25 (1): 319

- **Absence of SMARCB1 in rhabdoid tumor cells increases sensitivity to translation inhibition and alters translation efficiency of specific mRNAs.** *The Journal of biological chemistry*
  Nguyen, L. T., Hains, A. E., Aziz-Zanjani, M. O., Dalsass, M., Farooqee, S. B., Lu, Y., Jackson, P. K., Van Rechem, C.
  2024: 107988

- **Uncertainty Quantification and Interpretability for Clinical Trial Approval Prediction.** *Health data science*
  Lu, Y., Chen, T., Hao, N., Van Rechem, C., Chen, J., Fu, T.
  2024; 4: 0126

- **p53 governs an AT1 differentiation programme in lung cancer suppression.** *Nature*
  Kaiser, A. M., Gatto, A., Hanson, K. J., Zhao, R. L., Raj, N., Ozawa, M. G., Seoane, J. A., Bieging-Rolett, K. T., Wang, M., Li, I., Trope, W. L., Liou, D. Z., Shrager, et al
  2023

- **Computational workflow for integrative analyses of DNA replication timing, epigenomic, and transcriptomic data.** *STAR protocols*
  Ji, F., Van Rechem, C., Whetstine, J. R., Sadreyev, R. I.
  2022; 3 (4): 101827

- **Phosphoproteomic mapping reveals distinct signaling actions and activation of muscle protein synthesis by Isthmin-1.** *eLife*
  Zhao, M., Banhos Danneskiold-Samsøe, N., Ulicna, L., Nguyen, Q., Voilquin, L., Lee, D. E., White, J. P., Jiang, Z., Cuthbert, N., Paramasivam, S., Bielczyk-Maczynska, E., Van Rechem, C., Svensson, et al
  2022; 11

- **The interaction of SWI/SNF with the ribosome regulates translation and confers sensitivity to translation pathway inhibitors in cancers with complex perturbations.** *Cancer research*
  Ulicna, L., Kimmey, S. C., Weber, C. M., Allard, G. M., Wang, A., Bui, N. Q., Bendall, S. C., Crabtree, G. R., Bean, G. R., Van Rechem, C.
  2022

- **A cell-sorting-based protocol for cell cycle small-scale ChIP sequencing.** *STAR protocols*
  Whetstine, J. R., Van Rechem, C.
  2022; 3 (2): 101243

- **Protocol to isolate cells in four stages of S phase for high-resolution replication-timing sequencing.** *STAR protocols*
  Whetstine, J. R., Van Rechem, C.
  2022; 3 (1): 101209

- **Phosphoproteomic mapping reveals distinct signaling actions and activation of muscle protein synthesis by Isthmin-1** *eLife*
  Zhao, M., Banhos Danneskiold-Samsøe, N., Ulicna, L., Nguyen, Q., Voilquin, L., Lee, D. E., White, J. P., Jiang, Z., Cuthbert, N., Paramasivam, S., Bielczyk-Maczynska, E., van Rechem, C., Svensson, et al
  2022

- **Collective regulation of chromatin modifications predicts replication timing during cell cycle.** *Cell reports*
  Van Rechem, C., Ji, F., Chakraborty, D., Black, J. C., Sadreyev, R. I., Whetstine, J. R.
  2021; 37 (1): 109799

- **Integrated multi-omics analysis of RB-loss identifies widespread cellular programming and synthetic weaknesses.** *Communications biology*
  Rajasekaran, S., Siddiqui, J., Rakijas, J., Nicolay, B., Lin, C., Khan, E., Patel, R., Morris, R., Wyler, E., Boukhali, M., Balasubramanyam, J., Ranjith Kumar, R., Van Rechem, et al
  2021; 4 (1): 977

- **The lysine demethylase KDM4A controls the cell-cycle expression of replicative canonical histone genes** *BIOCHIMICA ET BIOPHYSICA ACTA-GENE REGULATORY MECHANISMS*
  Van Rechem, C., Ji, F., Mishra, S., Chakraborty, D., Murphy, S. E., Dillingham, M. E., Sadreyev, R., Whetstine, J. R.
  2020; 1863 (10): 194624

- **Histone Lysine Methylation Dynamics Control EGFR DNA Copy Number Amplification.** *Cancer discovery*
  Clarke, T. L., Tang, R. n., Chakraborty, D. n., Van Rechem, C. n., Ji, F. n., Mishra, S. n., Ma, A. n., Kaniskan, H. U., Jin, J. n., Lawrence, M. S., Sadreyev, R. I., Whetstine, J. R.
  2019
- **The Histone Deacetylase SIRT6 Restrains Transcription Elongation via Promoter-Proximal Pausing.** *Molecular cell*
  Etchegaray, J. P., Zhong, L. n., Li, C. n., Henriques, T. n., Ablondi, E. n., Nakadai, T. n., Van Rechem, C. n., Ferrer, C. n., Ross, K. N., Choi, J. E., Samarakkody, A. n., Ji, F. n., Chang, et al
  2019; 75 (4): 683–99.e7
- **METTL13 Methylation of eEF1A Increases Translational Output to Promote Tumorigenesis.** *Cell*
  Liu, S., Hausmann, S., Carlson, S. M., Fuentes, M. E., Francis, J. W., Pillai, R., Lofgren, S. M., Hulea, L., Tandoc, K., Lu, J., Li, A., Nguyen, N. D., Caporicci, et al
  2018
- **Cross-talk between Lysine-Modifying Enzymes Controls Site-Specific DNA Amplifications.** *Cell*
  Mishra, S. n., Van Rechem, C. n., Pal, S. n., Clarke, T. L., Chakraborty, D. n., Mahan, S. D., Black, J. C., Lawrence, M. S., Daniels, D. L., Whetstine, J. R.
  2018
- **E2F/DP Prevents Cell-Cycle Progression in Endocycling Fat Body Cells by Suppressing dATM Expression.** *Developmental cell*
  Guarner, A. n., Morris, R. n., Korenjak, M. n., Boukhali, M. n., Zappia, M. P., Van Rechem, C. n., Whetstine, J. R., Ramaswamy, S. n., Zou, L. n., Frolov, M. V., Haas, W. n., Dyson, N. J.
  2017; 43 (6): 689–703.e5
- **Hypoxia drives transient site-specific copy gain and drug-resistant gene expression** *GENES & DEVELOPMENT*
  Black, J. C., Atabakhsh, E., Kim, J., Biette, K. M., Van Rechem, C., Ladd, B., Burrowes, P. D., Donado, C., Mattoo, H., Kleinstiver, B. P., Song, B., Andriani, G., Joung, et al
  2015; 29 (10): 1018-1031
- **A Coding Single-Nucleotide Polymorphism in Lysine Demethylase KDM4A Associates with Increased Sensitivity to mTOR Inhibitors** *CANCER DISCOVERY*
  Van Rechem, C., Black, J. C., Greninger, P., Zhao, Y., Donado, C., Burrowes, P. D., Ladd, B., Christiani, D. C., Benes, C. H., Whetstine, J. R.
  2015; 5 (3): 245-254
- **Lysine Demethylase KDM4A Associates with Translation Machinery and Regulates Protein Synthesis** *CANCER DISCOVERY*
  Van Rechem, C., Black, J. C., Boukhali, M., Aryee, M. J., Graeslund, S., Haas, W., Benes, C. H., Whetstine, J. R.
  2015; 5 (3): 255-263
- **Examining the impact of gene variants on histone lysine methylation** *BIOCHIMICA ET BIOPHYSICA ACTA-GENE REGULATORY MECHANISMS*
  Van Rechem, C., Whetstine, J. R.
  2014; 1839 (12): 1463-1476
- **KDM4A Lysine Demethylase Induces Site-Specific Copy Gain and Rereplication of Regions Amplified in Tumors** *CELL*
  Black, J. C., Manning, A. L., Van Rechem, C., Kim, J., Ladd, B., Cho, J., Pineda, C. M., Murphy, N., Daniels, D. L., Montagna, C., Lewis, P. W., Glass, K., Allis, et al
  2013; 154 (3): 541-555
- **Identification of p21 (CIP1/WAF1) as a direct target gene of HIC1 (Hypermethylated In Cancer 1)** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
  Dehennaut, V., Loison, I., Boulay, G., Van Rechem, C., Leprince, D.
  2013; 430 (1): 49-53
- **Histone Lysine Methylation Dynamics: Establishment, Regulation, and Biological Impact** *MOLECULAR CELL*
  Black, J. C., Van Rechem, C., Whetstine, J. R.
  2012; 48 (4): 491-507
- **Hypermethylated in Cancer 1 (HIC1) Recruits Polycomb Repressive Complex 2 (PRC2) to a Subset of Its Target Genes through Interaction with Human Polycomb-like (hPCL) Proteins** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Boulay, G., Dubuissez, M., Van Rechem, C., Forget, A., Helin, K., Ayrault, O., Leprince, D.

2012; 287 (13): 10509-10524

- **Loss of Hypermethylated in Cancer 1 (HIC1) in Breast Cancer Cells Contributes to Stress-induced Migration and Invasion through beta-2 Adrenergic Receptor (ADRB2) Misregulation** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Boulay, G., Malaquin, N., Loison, I., Foveau, B., Van Rechem, C., Rood, B. R., Pourtier, A., Leprince, D.
  2012; 287 (8): 5379-5389
- **The Receptor Tyrosine Kinase EphA2 Is a Direct Target Gene of Hypermethylated in Cancer 1 (HIC1)** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Foveau, B., Boulay, G., Pinte, S., Van Rechem, C., Rood, B. R., Leprince, D.
  2012; 287 (8): 5366-5378
- **The Transcription Factor Encyclopedia** *GENOME BIOLOGY*
  Yusuf, D., Butland, S. L., Swanson, M. I., Bolotin, E., Ticoll, A., Cheung, W. A., Zhang, X. Y., Dickman, C. T., Fulton, D. L., Lim, J. S., Schnabl, J. M., Ramos, O. H., Vasseur-Cognet, et al
  2012; 13 (3)
- **The SKP1-Cul1-F-box and Leucine-rich Repeat Protein 4 (SCF-FbxL4) Ubiquitin Ligase Regulates Lysine Demethylase 4A (KDM4A)/ Jumonji Domain-containing 2A (JMJD2A) Protein** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Van Rechem, C., Black, J. C., Abbas, T., Allen, A., Rinehart, C. A., Yuan, G., Dutta, A., Whetstine, J. R.
  2011; 286 (35): 30462-30470
- **Conserved Antagonism between JMJD2A/KDM4A and HP1 gamma during Cell Cycle Progression** *MOLECULAR CELL*
  Black, J. C., Allen, A., Van Rechem, C., Forbes, E., Longworth, M., Tschoep, K., Rinehart, C., Quiton, J., Walsh, R., Smallwood, A., Dyson, N. J., Whetstine, J. R.
  2010; 40 (5): 736-748
- **Differential Regulation of HIC1 Target Genes by CtBP and NuRD, via an Acetylation/SUMOylation Switch, in Quiescent versus Proliferating Cells** *MOLECULAR AND CELLULAR BIOLOGY*
  Van Rechem, C., Boulay, G., Pinte, S., Stankovic-Valentin, N., Guerardel, C., Leprince, D.
  2010; 30 (16): 4045-4059
- **HIC1 interacts with a specific subunit of SWI/SNF complexes, ARID1A/BAF250A** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
  Van Rechem, C., Boulay, G., Leprince, D.
  2009; 385 (4): 586-590
- **Scavenger Chemokine (CXC Motif) Receptor 7 (CXCR7) Is a Direct Target Gene of HIC1 (Hypermethylated in Cancer 1)** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Van Rechem, C., Rood, B. R., Touka, M., Pinte, S., Jenal, M., Guerardel, C., Ramsey, K., Monte, D., Begue, A., Tschan, M. P., Stephan, D. A., Leprince, D.
  2009; 284 (31): 20927-20935
- **HIC1 (Hypermethylated in Cancer 1) epigenetic silencing in tumors** *INTERNATIONAL JOURNAL OF BIOCHEMISTRY & CELL BIOLOGY*
  Fleuriel, C., Touka, M., Boulay, G., Guerardel, C., Rood, B. R., Leprince, D.
  2009; 41 (1): 26-33