CURRICULUM VITAE

NAME **CRAIG MARTIN CREWS**

BORN June 1, 1964, Newport News, Virginia

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https://scholar.google.com/citations?user=0s7cqPYAAAAJ&hl=en&oi=sra

EDUCATION AND WORK EXPERIENCE

1982-1986	**B.A.**, **Chemistry**, University of Virginia
1986-1987	**DAAD Fellow**, Universität Tübingen, Germany
1987-1993	**Ph.D.**, **Biochemistry**, Dept of Biochemistry & Mol. Biology, Harvard University
1993-1995	**Postdoctoral Fellow**, Dept. of Chemistry, Harvard University
1995-2000	**Assistant Professor**, Yale University, Dept of Mol., Cell & Dev. Biology
1998-2000	**Assistant Professor**, Yale School of Medicine, Dept of Pharmacology
2000-2007	**Associate Professor**, Yale School of Medicine, Dept of Pharmacology
2000-2007	**Associate Professor**, Yale University, Dept of Molecular, Cellular & Developmental Biology *(tenured in 2001)*
2001-2007	**Associate Professor**, Yale University, Dept of Chemistry
2003	**Co-Founder**, Proteolix, Inc. (*sold to Onyx Pharmaceuticals, 2009*)
2003-	**Executive Director**, Yale Center for Molecular Discovery
2007-	**Professor**, Yale University, Depts. of MCDB, Chemistry, Pharmacology
2008- 2018	**Editor,** *Cell Chemical Biology* (formerly *Chemistry & Biology*)
2010-2019	**Lewis B. Cullman Professor** of MCDB
2010-2013	**Visiting Professor (Gast Professor)**, Universität Konstanz, Germany
2013	**Founder,** Arvinas, Inc (oncology-focused biotech) (*ARVN IPO 9/27/18*)
2015-2019	**Director**, Program for Innovative Therapeutics for CT's Health (PITCH) -(CT-based biotech accelerator)
2016-2019	**Member**, CTNext Board of Directors
2019-	**John C. Malone Professor** of MCDB
2013	**Founder,** Halda, LLC (oncology-focused biotech)
2021	**Founder,** Siduma, LLC (biotech)

HONORS AND AWARDS

1996-1999	**Burroughs Wellcome Fund New Investigator Award**
1996-1999	**Donaghue Foundation New Investigator Award**
1996-1998	**CaPCURE Award** (Assoc. for the Cure of Cancer of the Prostate)
2005-	**Fellow of the Royal Society of Chemistry**
2005	**Friedrich Wilhelm Bessel Award,** Alexander von Humboldt Foundation
2011	**Senior Scholar Award,** Ellison Medical Foundation
2013	**Fellow**, American Association for the Advancement of Science (AAAS)
2013	**Entrepreneur of the Year**, Connecticut United for Research Excellence (CURE)
2014	**UCB-Ehrlich Award for Excellence in Medicinal Chemistry** (European Federation of Medicinal Chemistry)

2015 **Outstanding Investigator Award (R35)**, National Cancer Institute (NIH)
2015 **2015 Translational Research Prize**, Yale Cancer Center
2017 **Award for Outstanding Achievement in Chemistry in Cancer Research,** American Association for Cancer Research (AACR)
2018 **Khorana Prize**, Royal Society of Chemistry
2018 **Pierre Fabre Award for Therapeutic Innovation**
2019 **American Cancer Society Professorship**
2019 **Pharmacia-ASPET Award for Experimental Therapeutics**
2019- **John C. Malone Professor** of Molecular, Cellular, & Developmental Biology
2020 **Heinrich Wieland Prize**, Boehringer Ingelheim Foundation
2021 **Scheele Prize,** Swedish Pharmaceutical Society
2021 **Honorary Doctoral Degree**, Technische Universität Dortmund, Germany (*doctor rerum naturalium honoris causa*)
2022 **Connecticut Medal of Technology**, CT Academy of Science and Engineering
2023 **Bristol Myers Squibb Award in Enzyme Chemistry,** American Chemical Society
2023 **Jacob and Louise Gabbay Award in Biotechnology and Medicine**, Brandeis University
2024 **Emanuel Merck Lectureship Award**, Technical University of Darmstadt and Merck, KGaA
2024 **Benvenuto Memorial Award,** MD Anderson Cancer Center
2024 **Kimberly Prize**, Northwestern School of Medicine and the Simpson Querrey Institute for Epigenetics

PROFESSIONAL PERSONNEL TRAINED

Graduate Students (29)
Postdoctoral Associates Trained (73)

PATENTS (18) /PATENT APPLICATIONS (31)

NEW VENTURES FOUNDED

2000 **Co-Founder**, Proteolix, Inc. (*sold to Onyx Pharmaceuticals, 2009*
2013 **Founder**, Arvinas, Inc. *(http://arvinas.com/)*
2019 **Founder**, Halda Therapeutics, LLC
2021 **Founder**, Siduma Therapeutic, LLC

FDA APPROVED DRUGS

Carfilzomib/Kyprolis™ (July 2012) *(http://en.wikipedia.org/wiki/Carfilzomib)*

ARVINAS DRUG CANDIDATES CURRENTLY IN CLINICAL TRIALS

PHASE 1
ARV-766 (Androgen Receptor Degrading PROTAC)

PHASE 2
ARV-110 (Androgen Receptor Degrading PROTAC)

PHASE 3
ARV-471 (Estrogen Receptor Degrading PROTAC)

INVITED LECTURES (>400 TOTAL-Details Upon Request**)**

PLENARY/KEYNOTE LECTURES

1) Kimberly Prize Lecture, Northwestern University, 2024
2) Emanuel Merck Lectureship, Darmstadt, Germany, 2024
3) Lemieux Lecture in Biotechnology, U. Alberta, Edmonton, 2023
4) Shaomeng Wang Drug Discovery Award Lecture, U. Michigan, 2023
5) Rinehart Lecture, U.Illinios Champaign-Urbana, 2022
6) 22nd Irving L. Schwartz Lecture, Mt.Sinai School of Medicine, 2022
7) Bristol Myers Squibb Lecture, UC Berkeley, 2022
8) Smissman Memorial Lecture, U.Kansas, 2022
9) Myron & Muriel Bender Distinguished Lecture in Organic Chemistry, Northwestern U., 2022
10) AACR-Irving Weinstein Foundation Distinguished Lecture, 2022
11) C.V. Ramakrishnan Lecture, U.Baroda, India, 2022
12) Scheele Prize Symposium, Stockholm 2021
13) Wieland Prize Symposium, Munich 2021
14) David James Lecture, University of Cambridge, 2021
15) VIth International Drug Discovery and Development Forum, 2020
16) CHAINS: The Dutch Chemistry Conference, 2020
17) Novartis Lecture, Scripps Research Institute, 2020
18) Targeted Protein Degradation Summit, 2020
19) Israeli Chemistry Society Annual Meeting, 2020
20) Terry Fox Cancer Symposium, 2019
21) NIH Director's Wednesday Afternoon Lecture, 2019
22) Targeted Protein Degradation Conference, 2019
23) European Protein Degradation Congress, 2019
24) International Chemical Biology Society Annual Meeting, 2018
25) Royal Society of Chemistry, 'Chemical Biology Meets Drug Discovery', 2018
26) Israeli Chemistry Society Medicinal Chemistry Symposium, 2018
27) Vienna Biocenter Ubiquitin Symposium, 2018
28) David Chu Lecture, U. Georgia, 2018
29) University Lecture, UT-Southwestern Medical Center
30) Lilly-Brown Lecture, Purdue University, 2017
31) Belleau Lecture, McGill University, 2017
32) Chinese Medicinal Chemistry Symposium, 2017
33) Virginia Drug Discovery Symposium, 2017
34) CHI Drug Discovery Conference, 2017
35) Lemieux Lecture, University of Ottawa, 2016
36) Discovery on Target: The Ubiquitin Proteasome System, 2016
37) Leopold Symposium on Drug Discovery and Translation, 2016
38) XXIII International Symposium on Medicinal Chemistry, 2014

39) XXII International Symposium on Medicinal Chemistry, 2012
40) Pfizer Distinguished Lecturer, Colorado State University, 2012
41) American Society of Pharmacognosy 2011 Meeting, 2011
42) European Institute of Chemistry and Biology Symposium, 2011
43) Vanderbilt Chemical Biology Symposium, 2010
44) Pfizer 2009 Worldwide Medicinal Chemistry Symposium, 2009
45) Biotechnology and Biological Sciences Research Council Chemical Biology Workshop, 2007
46) Institut de Chimie des Substances Naturelles 9th Symposium, 2004

Summaries of 10 Most Significant Publications *(Google scholar citations as of 12/5/23 in parentheses)*

1. Sakamoto, K.M., Kim, K.B., Kumagai, A., Mercurio, F., Crews, C.C., and Deshaies, R.J. (2001). Protacs: Chimeric molecules that target proteins to the Skp1-Cullin-F box complex for ubiquitination and degradation. *Proc. Natl. Acad. Sci. USA* 98, 8554-9. *(1644 citations)*
First conception of PROTACs and demonstration of proof-of-concept. Notably, this paper articulated the main theoretical advantages of PROTACs that animate the field to this day.

2. Schneekloth, J.S. Jr., Fonseca, F.N., Koldobskiy, M., Mandal, A., Deshaies, R., Sakamoto, K., and Crews, C.M. (2004). Chemical genetic control of protein levels: selective in vivo targeted degradation. *J. Am. Chem. Soc.* 126, 3748-3754. (*482 citations*)
First demonstration of PROTACs that are cell-permeable and based on a ligand that binds to VHL. VHL remains one of the two most popular ubiquitin ligases to effect targeted protein degradation with heterobifunctional molecules.

3. Sakamoto, K.M., Kim, K.B., Verma, R., Ransick, A., Stein, B., Crews, C.M., and Deshaies, R.J. (2003). Development of PROTACs to target cancer-promoting proteins for ubiquitination and degradation. *Mol. Cell. Proteomics* 2, 1350-1358. (*383 citations*)

   First demonstration that targeted protein degradation can be used to control stability of estrogen receptor and androgen receptor. These two receptors are the targets of the two most clinically-advanced PROTACs

4. Bondeson DP, Mares A, Smith IED, Ko E, Campos S, Miah AH, Mulholland KE, Routly N, Buckley DL, Gustafson JL, Zinn N, Grandi P, Shimamura S, Bergamini G, Faelth-Savitski M, Bantscheff M, Cox C, Gordon DA, Willard RR, Flanagan JJ, Casillas LN, Votta BJ, den Besten W, Famm K, Sruidenier L, Carter PS, Harling JD, Churcher I, & Crews CM (2015) Catalytic in vivo protein knockdown by small-molecule PROTACs. *Nat Chem Biol*. 2015 Aug;11(8):611-7. PMID: 26075522 doi: 10.1038/nchembio.1858. *(994 citations)*

   First demonstration of PROTAC-mediated in vivo degradation of drug target. The 'all small molecule' PROTACs described for the first time changed the opinion of the pharmaceutical industry- what once was a 'chemical biology curiosity' now has pharmaceutical properties that are conducive to modern medicinal chemistry and drug development.

5. Lu J, Qian Y, Altieri M, Dong , Wang J, Raina K, Hines J, Winkler JD, Crew AP, Coleman K, Crews CM (2015) Hijacking the E3 ubiquitin ligase cereblon to efficiently target BRD4.
   Chemistry & Biology 22 (6), 755-763 (*986 citations*)

First demonstration of a cereblon-based PROTAC. This class of PROTACs has favorable drug-like properties and has served as the basis for the majority of oral PROTAC drug candidates that are currently being testing in clinical trials.

6. Bond M, Chu L, Nalawansha D, Li K, Crews CM. (2020) Targeted Degradation of Oncogenic KRAS^{G12C} by VHL-recruiting PROTACs *ACS Central Science,* 6(8):1367–1375. doi: 10.1021/acscentsci.0c00411. PMID: 32875077 *(237 citations)*

   First demonstration that an oncogenic KRas mutant can be targeted for degradation. As a recent 'undruggable' target, PROTAC-mediated KRas protein is solid evidence for degradation as a new therapeutic modality capable of opening up the "Drug Target Space" in drug development.

7. Lai, AC, Toure, M, Hellerschmied, D, Salami, J, Jaime-Figueroa, S, Ko, E, Hines, J, Crews, CM (2016) Modular PROTAC Design for the Degradation of Oncogenic BCR-Abl. *Angewandte Chemie Int. Ed. Engl.* 55: 807–810. PMID:26593377 *(605 citations)*

   First demonstration that differential degradation of target proteins can be achieved via recruitment to different E3 ligases.

8. Burslem GM, Smith BE, Lai A, Jaime-Figueroa S, McQuaid D, Bondeson DP, Toure M, Dong H, Qian Y, Wang J, Crew AP, Hines J, Crews CM (2018). The Advantages of Targeted Protein Degradation over Inhibition: a RTK Case Study *Cell Chemical Biology*. 25:67-77. PMID:29129716 *(479 citations)*

   First demonstration of 'differential biology', i.e., the advantages one can achieve via degrading a target protein versus simply inhibiting it. These study showed that not only the enzymatic activity but also the scaffolding role of kinases can be targeted therapeutically.

9. Bondeson DP, Smith BE, Burslem GM, Buhimschi AD, Hines J, Jaime-Figueroa S, Wang J, Hamman B, Ishchenko A, Crews CM. (2018) Lessons in PROTAC Design from Selective Degradation with a Promiscuous Warhead *Cell Chemical Biology* 25(1):78-87. PMID:29129718 *(597 citations)*

   First demonstration that increased target protein selectivity can be gained via the neo-Protein:Protein Interface (PPI) that is inherent to potent PROTACs.

10. Smith BE, Wang SL, Jaime-Figueroa S, Harbin A, Wang J, Hamman BD, Crews CM. (2019). Differential PROTAC substrate specificity dictated by orientation of recruited E3 ligase. *Nat Commun.* Jan 10;10(1):131. PMID:30631068 *(346 citations)*

    First demonstration that the presentation of the target protein to the E3 ligase can dictate substrate specificity for degradation. Using the same recruiting substrate ligand and the same E3 ligase ligand, we showed that changing the geometry of their coupling changes the degradation specificity for related kinase family members.

TOTAL PUBLICATIONS: 188 H-Index: 97 (Google Scholar)

(1) Alcorta D, CM Crews, LJ Sweet, L Bankston, SW Jones, and RL Erikson. (1989) Sequence and expression of chicken and mouse rsk: homologs of *Xenopus laevis* ribosomal S6 kinase. *Mol. Cell. Biol.,* 9:3850-3859. PMCID: PMC362446

(2) Crews CM, AA Alessandrini, and RL Erikson. (1991) Mouse Erk-1 gene product is a serine/threonine protein kinase that has the potential to phosphorylate tyrosine. *Proc. Natl. Acad. Sci. USA*, 88:8845-8849. PMCID: PMC52607

* *subject of commentary in 'The Scientist'*

(3) Crews CM, AA Alessandrini, and RL Erikson. (1992) The primary structure of MEK, a protein kinase that phosphorylates and activates the ERK gene product. *Science*, 258:478-480. PMID: 1411546

* *subject of commentary in 'Journal of NIH Research'*

(4) Crews CM and RL Erikson. (1992) Purification of a murine protein-tyrosine/threonine kinase that phosphorylates and activates the Erk1 gene product: Relationship to the fission yeast byr1 gene product. *Proc. Natl. Acad. Sci. USA*, 89:8205-8209. PMCID: PMC49886

(5) Alessandrini AA, CM Crews, and RL Erikson. (1992) Phorbol ester stimulates a protein tyrosine/threonine kinase that phosphorylates and activates the Erk1 gene product. *Proc. Natl. Acad. Sci. USA*, 89:8200-8204. PMCID: PMC49885

(6) Calvo V, CM Crews, TA Vik, and BE Bierer. (1992) Interleukin 2 stimulation of p70 S6 kinase is inhibited by the immunosuppressant rapamycin. *Proc. Natl. Acad. Sci. USA*, 89:7571-7575. PMCID: PMC49752

(7) Crews CM, AA Alessandrini, and RL Erikson. (1992) Erks: Their fifteen minutes has arrived. *Cell Growth and Differentiation*, 3:135-142. PMID: 1504018

(8) Crews, CM and RL Erikson. (1993) Extracellular signals and reversible protein phosphorylation: What to MEK of it all. *Cell.* 74:215-217. PMID: 8343948

(9) Macdonald SG, CM Crews, L Wu, J Driller, R Clark, RL Erikson, F McCormick. (1993) Reconstitution of the raf-1-MEK-ERK signal transduction pathway in vitro. *Mol. Cell. Biol.,* 13:6615-6620. PMCID: PMC364724

(10) Huang W, AA Alessandrini, CM Crews, RL Erikson. (1993) Raf-1 forms a stable complex with MEK1 and activates MEK1 by serine phosphorylation. *Proc. Natl. Acad. Sci. USA*, 90:10947-10951. PMCID: PMC47898

(11) Brott BK, AA Alessandrini, DA Largaespada, NG Copeland, NA Jenkins, CM Crews, and RL Erikson. (1993) MEK2 is a kinase related to MEK1 and is differentially expressed in murine tissues. *Cell Growth Differ.* 4(11):921-9. PMID: 8297798

(12) Crews CM, JL Collins, WS Lane, ML Snapper, and SL Schreiber. (1994) GTP-dependent binding of the antiproliferative agent didemnin to elongation factor 1*a**. *J.Biol.Chem.* 269:15411-15414. PMID: 8195179

* *subject of 'Chemistry and Engineering News' (CEN) commentary*

(13) Erikson RL, AA Alessandrini, CM Crews. (1995) Mek1, Mapk/Erk Kinase The Protein Kinase Facts Book p.275-277.

- Assumed Independent Research Program at Yale University –

(14) Crews CM, WS Lane, and SL Schreiber. (1996) Didemnin binds to the protein palmitoyl thioesterase responsible for infantile neuronal ceroid lipofuscinosis *Proc. Natl. Sci. USA*, 93:4316-4319. PMCID: PMC39533

(15) Crews CM. (1996) Deciphering Isozyme Function: Exploring Cell Biology with Chemistry in the Post-Genomic Era *Chemistry and Biology* 3:961-965. PMID: 9000005

(16) Sin N, L Meng, MQW Wang, JJ Wen, WG Bornmann, and CM Crews. (1997) The anti-angiogenic agent fumagillin covalently binds and inhibits methionine aminopeptidase, MetAP-2. *Proc. Natl. Acad. Sci. USA*, 94:6099-6103. PMCID: PMC21008

* *subject of commentaries in Chemistry & Engineering News (CEN), Chemistry & Biology, Pharmacia (published by the Pharmaceutical Society of Japan)*

(17) Wen JJ and CM Crews. (1998) Towards the semi-synthesis of Didemnin M. Solution and solid phase synthesis of a pseudotetrapeptide: pGlu-Glnψ[COO]Ala-Pro-OH. *Tetrahedron Letters*, 39 (8):779-782.

(18) Elofsson M and CM Crews. (1998) Tightening the Nuts and Bolts. *Trends in Biotechnology*,16:147-149.

(19) Wen JJ, and CM Crews. (1998) Synthesis of 9-Fluorenylmethoxycarbonyl Protected Amino Aldehydes. *Tetrahedron Asymmetry,* 9 (11): 1855-1858.

(20) Sin N, L Meng, H Auth, and CM Crews. (1998) Eponemycin Analogs: Syntheses and use as probes of angiogenesis. *Bioorganic & Med.Chem.*6:1209-1217 PMID: 9784862

(21) Meng L, N Sin, and CM Crews. (1998) The antiproliferative agent, didemnin B, uncompetitively inhibits palmitoyl protein thioesterase. *Biochemistry* 37(29):10488-10492. PMID: 9671519

(22) Liu S, J Widom, CW Kemp, CM Crews, and J Clardy. (1998) Structure of Human Methionine Aminopeptidase-2 Complexed with Fumagillin. *Science* 282:1324-1327 PMID: 9812898

** *subject of 'Chemistry and Engineering News' (CEN) and 'Drug Discovery and Development' commentaries*

(23) Meng L, B Kwok, N Sin, and CM Crews. (1999) Eponemycin Exerts its Antitumor Effect through Inhibition of Proteasome Function. *Cancer Research,* 59: 2798-2801. PMID: 10383134

(24) Crews, CM and U Splittgerber. (1999) Chemical Genetics: Exploring and Controlling Cellular Processes with Chemical Probes. *Trends in Biochemical Sciences*, 24:317-320. PMID: 10431176

(25) Sin N, KB Kim, M Elofsson, L Meng, H Auth, BHB Kwok, and CM Crews. (1999) Total Synthesis of the Potent Proteasome Inhibitor Epoxomicin: A Useful Tool for Understanding Proteasome Biology. *Bioorganic & Med. Chem. Letters,* 9:2283-2288. PMID: 10465562

(26) Meng L, R Mohan, BHK Kwok, M Elofsson, N Sin and CM Crews. (1999) Epoxomicin, a Potent and Selective Proteasome Inhibitor exhibits *in vivo* Anti-inflammatory Activity. *Proc. Natl. Acad. Sci. USA*, 96:10403-10408. PMCID: PMC17900

(27) Elofsson M, U Splittgerber, J Myung, and CM Crews. (1999) Towards Subunit specific Proteasome Inhibitors: Synthesis and Evaluation of Peptide α'β' epoxyketones. *Chemistry & Biology*, 6:811-822. PMID: 10574782

* *subject of 'Chemistry and Engineering News' (CEN)*

(28) Kim K, J Myung, N Sin, and CM Crews. (1999) Proteasome Inhibition by the Natural Products Eponemycin and Dihydroeponemycin: Insights into Specificity and Potency. *Bioorg. Med. Chem. Lett.* 9:3335-3340. PMID: 10612595

(29) Groll M, K Kim, N Kairies, R Huber, and CM Crews. (2000) Crystal Structure of Epoxomicin:20S Proteasome Reveals a Molecular Basis for Selectivity of α'β'-Epoxyketone Proteasome Inhibitors. *J.Am.Chem.Soc.,* 122:1237-1238.

* *subject of 'Chemistry and Engineering News' (CEN)*

(30) Crews CM and R Mohan. (2000) Small-Molecule inhibitors of the Cell Cycle. *Curr. Opin. Chem. Biol.* 4:47-53. PMID: 14593706

(31) Schwarz K, R de Giuli, G Schmidtke, S Kostka, M van den Broek, K Kim, CM Crews, R Kraft, and M Groettrup. (2000) The selective proteasome inhibitors lactacystin and epoxomicin can be used to either up- or down-regulate antigen presentation at nontoxic doses *J. Immunology*, 164(12):6147-57. PMCID: PMC2507740

(32) Shotwell JB, S Hu, E Medina, M Abe, R Cole, CM Crews, and JL Wood. (2000) Efficient stereoselective synthesis of isopanepoxydone and panepoxydone: A re-assignment of relative stereochemistry. *Tetrahedron Letters*, 41:9639-9643.

(33) Yeh J, R Mohan, and CM Crews. (2000) The Antiangiogenic Agent TNP-470 requires p53 and $p21^{CIP/WAF}$ for Endothelial Cell Growth Arrest. *Proc. Natl. Acad. Sci. USA*,97:12782-12787 PMCID: PMC18841

(34) Princiotta MF, U Schubert, I Bacik, JR Bennink, J Myung, CM Crews, and JW Yewdell. (2001) Cells adapted to the proteasome inhibitor 4-hydroxy- 5-iodo-3-nitrophenylacetyl-Leu-Leu-leucinal-vinyl sulfone require enzymatically active proteasomes for continued survival. *Proc. Natl. Acad. Sci. USA*, 98(2):513-518. PMCID: PMC14618

(35) Myung J, K Kim, KK Lindsten, NP Dantuma, and CM Crews. (2001) Lack of Proteasome Active Site Allostery as Revealed by Subunit-Specific Inhibitors. *Molecular Cell*, 7(2):411-420. PMID: 11239469

(36) Myung J, K Kim, CM Crews. (2001) The Ubiquitin-proteasome Pathway and Proteasome Inhibitors. *Medicinal Research Reviews,* 21:245-273. PMCID: PMC2556558

(37) Kwok HB, B Koh, M Ndubuisi, M Elofsson, and CM Crews. (2001) The Anti-inflammatory Natural Product Parthenolide from the Medicinal Herb Feverfew Directly Binds to and Inhibits IκB Kinase. *Chemistry & Biology* 8(8):759-66. PMID: 11514225

(38) Sakamoto KM, KB Kim, A Kumagai, F Mercurio, CM Crews, and RJ Deshaies. (2001) Protacs: Chimeric Molecules that Target Proteins to the Skp1-Cullin-F Box Complex for Ubiquitination and Degradation, *Proc. Natl. Acad. Sci. USA* 98:8554-8559. PMCID: PMC37474

(39) Ndubuisi M, B Kwok, J Vervoort, M Elofsson, and CM Crews. (2002) Characterization of a Novel Mammalian Phosphatase Having Sequence Similarity to Schizosaccharomyces pombe PHO2 and Saccharomyces cerevisiae PHO13. *Biochemistry*, 41(24):7841-8. PMCID: PMC2556553

(40) Shotwell JB, B Koh, M Ndubuisi, HW Choi, E Medina, JL Wood, CM Crews. (2002) Inhibitors of NF-κB Signalling: Design and Synthesis of a Biotinylated Isopanepoxydone Affinity Reagent. *Bioorganic and Medicinal Chemistry Letters* 12 (23): 3463-3466 PMID: 12419384

(41) Shotwell JB, ES Krygowski, J Hines, B Koh, EWD Huntsman, HW Choi, JS Schneekloth Jr., JL Wood, and CM Crews. (2002) Total Synthesis of Luminacin D *Organic Letters*, 5;4(18):3087-9 PMCID: PMC2556570

(42) Koh B and CM Crews. (2002) Chemical Genetics: A Small Molecule Approach to Neurobiology *Neuron* 14;36(4):563-6. PMID: 12441047

(43) Crews CM and KB Kim. (2003) Natural and Synthetic Inhibitors of the Proteasome. Proteasome Inhibitors in Cancer Therapy. (J. Adams, editor)

(44) Crews CM and JB Shotwell. (2003) Small Molecule Inhibitors of the Cell Cycle *Prog Cell Cycle Res.* 5:125-33 PMID: 14593706

(45) Garrett IR, G Gutierrez, G Rossini, M Zhao, KB Kim, S Hu, CM Crews, and GR Mundy. (2003) Selective inhibitors of the osteoblast proteasome stimulate bone formation *in vivo* and i*n vitro*. *J Clin Invest*. 111(11):1771-82. PMCID: PMC156102

(46) Yang Z-Q, B Kwok, S Lin, M Koldobskiy, CM Crews, and SJ Danishefsky. (2003) Simplified Synthetic TMC-95A/B Analogues Retain the Potency of Proteasome Inhibition *ChemBioChem* 4:508-513. PMCID: PMC2556569

(47) Yeh J and CM Crews. (2003) Chemical Genetics: Adding to the Developmental Biology Toolbox *Developmental Cell* 5(1):11-19. PMID: 12852848

(48) Crews CM. (2003) Feeding the Machine: Mechanisms of Proteasome-catalyzed Degradation of Ubiquinated Proteins *Curr Opin in Chemical Biology*,7(5):534-9. PMID: 14580555

(49) Sakamoto KM, K Kim, R Verma, A Ransick, B Stein, CM Crews, and RJ Deshaies. (2003) Development of Protacs to Target Cancer-Promoting Proteins for Ubiquitination and Degradation *Mol Cell Proteomics* 2(12):1350-1358. PMID: 14525958

(50) Brdlik C, and CM Crews. (2004) A Single Amino Acid Residue Defines the Difference in Ovalicin Sensitivity Between Type I and II Methionine Aminopeptidases. *J.Biol.Chem.* **279**:9475-80. PMCID: PMC2556556

(51) Schneekloth Jr., JS, F Fonseca, M Koldobskiy, A Mandal, R Deshaies, K Sakamoto, and CM Crews. (2004) Chemical Genetic Control of Protein Levels: Selective *in vivo* Targeted Degradation *JACS* **126**(12):3748-54 PMID: 15038727

(52) Lin S, ZQ Yang, BH Kwok, M Koldobskiy, CM Crews, SJ Danishefsky. (2004) Total synthesis of TMC-95A and -B via a new reaction leading to Z-enamides. Some preliminary findings as to SAR. *JACS*. **126**(20):6347-55. PMCID: PMC2507741

(53) Schneekloth Jr., JS, CM Crews. (2005) Chemical Approaches to Controlling Intracellular Protein Degradation *ChemBioChem* 6(1):40-6. PMCID: PMC2556563

(54) Kim KB, F Fonseca, CM Crews. (2005) Development and Characterization of Proteasome Inhibitors *Methods in Enzymology* (399):585-609. PMCID: PMC2556561

(55) Gough JD and CM Crews. (2006) Probing Protein Function with small molecules. *Ernst Schering Research Foundation* Chemical Genomics *Workshop Proceedings.* (58):61-74. PMID: 16708999

(56) Mandal, AK, JS Schneekloth Jr., and CM Crews. (2005) Stereoselective Assembly of a 1,3 Diene via Coupling between an Allenic Acetate and a (B)-alkylborane: Synthetic Studies on Amphidinolide B1. *Organic Letters*, 7(17):3645-8 PMCID: PMC2507736

(57) Mandal A, J Hines, and CM Crews. (2005) Developing Microcolin A Analogues as Biological Probes *Bioorg. Med.Chem Letters* **15**(18):4043-7 PMCID: PMC2507739

(58) Leuenroth S and CM Crews. (2005) Studies on Calcium Dependence Reveal Multiple Modes of Action for Triptolide *Chemistry& Biology* **12**(12):1259-68. PMCID: PMC2486259

(59) Mandal AK, JS Schneekloth Jr., K Kuramochi, CM Crews. (2006) Synthetic studies on amphidinolide B1. *Organic Letters* 8(3):427-30. PMCID: PMC2507747

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