

CURRICULUM VITAE

Lars Christian Pedersen

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EDUCATION

1990 B.S., Chemistry, University of North Carolina, Chapel Hill, NC
1994 Ph.D., Biochemistry, University of Washington, Seattle, WA

EMPLOYMENT

1991-1992 Teaching Assistant, University of Washington, Seattle, WA
1994-1996 PostDoc, Institute for Enzyme Research, U. of Wisconsin-Madison, Madison, Wis.
1996-1997 IRTA Fellow, NIEHS (NIH), RTP, NC
1997-2001 Research Fellow, NIEHS (NIH), RTP, NC
2001-present Staff Scientist, Co-Director of Structural Biology Core, Head of Structure Function Group, NIEHS (NIH), RTP, NC

ADJUNCT APPOINTMENTS

2007-present Adjunct Associate Professor with the Division of Chemical Biology and Medicinal Chemistry, School of Pharmacy, University of North Carolina at Chapel Hill, NC

HONORS & AWARDS

1994/95 The University of Washington Graduate School's Dissertation Prize in Protein Science (for thesis entitled: X-ray Structure Determination of Factor XIII)
1997 National Institutes of Health Award of Merit
2006 National Institutes of Health Peer Award
2011 NIEHS Paper of the Year Award: "The structure of the dust mite allergen Der p 7 reveals similarities to innate immune proteins. J. Allergy Clin Immunol. 125:909-17 (2010)."
2018 National Institute of Health Award of Merit for implementation of CryoEM at NIEHS

INVITED PRESENTATIONS:

1998 Department of Biochemistry and Biophysics, University of North Carolina
1998 Department of Biochemistry Research Seminar, Oklahoma Medical Research Foundation
2001 Kobe Pharmaceutical University, Japan.
2001 Osaka University, Japan.

- 2001 Xth International Workshop on Glucuronidation and the UDP-Glucuronosyltransferases, Japan
- 2001 Department of Pharmacy, University of North Carolina
- 2002 Department of Biochemistry, St. Louis University
- 2005 Biochemistry Seminar Series, North Carolina State University
- 2005 Biophysics Form, University of North Carolina
- 2006 Department of Biochemistry, University of Washington
- 2007 Japanese Society of Carbohydrate Research, Fukuoka, Japan
- 2008 Nebraska Research and Innovation Conference, Lincoln, Nebraska
- 2011 EAL:Proteoglycans:Health, Disease and Therapeutics, Nancy, France
- 2011 Current Opinion Conference: Structural Biology and DNA Repair, Amsterdam, Netherlands
- 2013 American Chemical Society Meeting: CARB section, New Orleans
- 2013 University of North Carolina Career Blitz, University of North Carolina
- 2013 Division of Medicinal and Natural Products Chemistry, University of Iowa
- 2014 Proteoglycans Gordon Conference, Andover New Hampshire
- 2014 12th International Symposium on Cytochrome P450, Kyoto Japan
- 2014 Pharmacogenetics Seminar Series, NIEHS
- 2016 University of Cincinnati, Dept. of Molecular Genetics Seminar Series, Cincinnati, Ohio
- 2017 University of South Carolina, Dept. of Chemistry and Biochemistry, Columbia, South Carolina

Articles in peer-reviewed journals:

1. **PEDERSEN LC**, Yee VC, Bishop PD, Le Trong I, Teller DC, Stenkamp RE. Transglutaminase factor XIII uses proteinase-like catalytic triad to crosslink macromolecules. *Protein science : a publication of the Protein Society*. 1994;3(7):1131-5. Epub 1994/07/01. doi: 10.1002/pro.5560030720. PubMed PMID: 7920263; PMCID: PMC2142901.
2. **PEDERSEN LC**, Yee VC, von Dassow G, Hazeghazam M, Reeck GR, Stenkamp RE, Teller DC. The corn inhibitor of blood coagulation factor XIIa. Crystallization and preliminary crystallographic analysis. *Journal of molecular biology*. 1994;236(1):385-7. Epub 1994/02/11. doi: 10.1006/jmbi.1994.1147. PubMed PMID: 8107123.
3. Yee VC, **PEDERSEN LC**, Le Trong I, Bishop PD, Stenkamp RE, Teller DC. Three-dimensional structure of a transglutaminase: human blood coagulation factor XIII. *Proceedings of the National Academy of Sciences of the United States of America*. 1994;91(15):7296-300. Epub 1994/07/19. PubMed PMID: 7913750; PMCID: PMC44386.
4. **PEDERSEN LC**, Benning MM, Holden HM. Structural investigation of the antibiotic and ATP-binding sites in kanamycin nucleotidyltransferase. *Biochemistry*. 1995;34(41):13305-11. Epub 1995/10/17. PubMed PMID: 7577914.
5. Yee VC, **PEDERSEN LC**, Bishop PD, Stenkamp RE, Teller DC. Structural evidence that the activation peptide is not released upon thrombin cleavage of factor XIII. *Thrombosis research*. 1995;78(5):389-97. Epub 1995/06/01. PubMed PMID: 7660355.
6. Kakuta Y, Pedersen LG, Carter CW, Negishi M, **PEDERSEN LC**. Crystal structure of estrogen sulphotransferase. *Nature structural biology*. 1997;4(11):904-8. Epub 1997/11/14. PubMed PMID: 9360604.
7. Behnke CA, Yee VC, Trong IL, **PEDERSEN LC**, Stenkamp RE, Kim SS, Reeck GR, Teller DC. Structural determinants of the bifunctional corn Hageman factor inhibitor: x-ray crystal structure at 1.95 Å resolution. *Biochemistry*. 1998;37(44):15277-88. Epub 1998/11/04. doi: 10.1021/bi9812266. PubMed PMID: 9799488.
8. Kakuta Y, **PEDERSEN LC**, Chae K, Song WC, Leblanc D, London R, Carter CW, Negishi M. Mouse steroid sulfotransferases: substrate specificity and preliminary X-ray crystallographic analysis. *Biochemical pharmacology*. 1998;55(3):313-7. Epub 1998/03/04. PubMed PMID: 9484797.

9. Kakuta Y, Pedersen LG, **PEDERSEN LC**, Negishi M. Conserved structural motifs in the sulfotransferase family. Trends in biochemical sciences. 1998;23(4):129-30. Epub 1998/05/19. PubMed PMID: 9584614.
10. Kakuta Y, Petrotchenko EV, **PEDERSEN LC**, Negishi M. The sulfuryl transfer mechanism. Crystal structure of a vanadate complex of estrogen sulfotransferase and mutational analysis. The Journal of biological chemistry. 1998;273(42):27325-30. Epub 1998/10/09. PubMed PMID: 9765259.
11. Sueyoshi T, Kakuta Y, **PEDERSEN LC**, Wall FE, Pedersen LG, Negishi M. A role of Lys614 in the sulfotransferase activity of human heparan sulfate N-deacetylase/N-sulfotransferase. FEBS letters. 1998;433(3):211-4. Epub 1998/09/23. PubMed PMID: 9744796.
12. Bartolotti L, Kakuta Y, Pedersen L, Negishi M, Pedersen L. A quantum mechanical study of the transfer of biological sulfate. J Mol Struct-Theochem. 1999;461:105-11. doi: Doi 10.1016/S0166-1280(98)00424-2. PubMed PMID: WOS:000079265300011.
13. Fox BA, Yee VC, **PEDERSEN LC**, Le Trong I, Bishop PD, Stenkamp RE, Teller DC. Identification of the calcium binding site and a novel ytterbium site in blood coagulation factor XIII by x-ray crystallography. The Journal of biological chemistry. 1999;274(8):4917-23. Epub 1999/02/13. PubMed PMID: 9988734.
14. Kakuta Y, Sueyoshi T, Negishi M, **PEDERSEN LC**. Crystal structure of the sulfotransferase domain of human heparan sulfate N-deacetylase/ N-sulfotransferase 1. The Journal of biological chemistry. 1999;274(16):10673-6. Epub 1999/04/10. PubMed PMID: 10196134.
15. Marsolais F, Laviolette M, Kakuta Y, Negishi M, **PEDERSEN LC**, Auger M, Varin L. 3'-Phosphoadenosine 5'-phosphosulfate binding site of flavonol 3-sulfotransferase studied by affinity chromatography and ³¹P NMR. Biochemistry. 1999;38(13):4066-71. Epub 1999/04/09. doi: 10.1021/bi982239m. PubMed PMID: 10194320.
16. Ong E, Yeh JC, Ding Y, Hindsgaul O, **PEDERSEN LC**, Negishi M, Fukuda M. Structure and function of HNK-1 sulfotransferase. Identification of donor and acceptor binding sites by site-directed mutagenesis. The Journal of biological chemistry. 1999;274(36):25608-12. Epub 1999/08/28. PubMed PMID: 10464296.
17. Petrotchenko EV, Doerflein ME, Kakuta Y, **PEDERSEN LC**, Negishi M. Substrate gating confers steroid specificity to estrogen sulfotransferase. The Journal of biological chemistry. 1999;274(42):30019-22. Epub 1999/10/09. PubMed PMID: 10514486.
18. Gorokhov A, Perera L, Darden TA, Negishi M, **PEDERSEN LC**, Pedersen LG. Heparan sulfate biosynthesis: a theoretical study of the initial sulfation step by N-deacetylase/N-sulfotransferase. Biophysical journal. 2000;79(6):2909-17. Epub 2000/12/07. doi: 10.1016/s0006-3495(00)76528-3. PubMed PMID: 11106599; PMCID: PMC1301170.
19. King RS, Sharma V, **PEDERSEN LC**, Kakuta Y, Negishi M, Duffel MW. Structure-function modeling of the interactions of N-alkyl-N-hydroxyanilines with rat hepatic aryl sulfotransferase IV. Chemical research in toxicology. 2000;13(12):1251-8. Epub 2000/12/22. PubMed PMID: 11123966.
20. **PEDERSEN LC**, Petrotchenko EV, Negishi M. Crystal structure of SULT2A3, human hydroxysteroid sulfotransferase. FEBS letters. 2000;475(1):61-4. Epub 2000/06/16. PubMed PMID: 10854859.
21. **PEDERSEN LC**, Tsuchida K, Kitagawa H, Sugahara K, Darden TA, Negishi M. Heparan/chondroitin sulfate biosynthesis. Structure and mechanism of human glucuronyltransferase I. The Journal of biological chemistry. 2000;275(44):34580-5. Epub 2000/08/18. doi: 10.1074/jbc.M007399200. PubMed PMID: 10946001.
22. Petrotchenko EV, **PEDERSEN LC**, Borchers CH, Tomer KB, Negishi M. The dimerization motif of cytosolic sulfotransferases. FEBS letters. 2001;490(1-2):39-43. Epub 2001/02/15. PubMed PMID: 11172807.
23. **PEDERSEN LC**, Darden TA, Negishi M. Crystal structure of beta 1,3-glucuronyltransferase I in complex with active donor substrate UDP-GlcUA. The Journal of biological chemistry. 2002;277(24):21869-73. Epub 2002/04/16. doi: 10.1074/jbc.M112343200. PubMed PMID:

11950836.

24. **PEDERSEN LC**, Petrotchenko E, Shevtsov S, Negishi M. Crystal structure of the human estrogen sulfotransferase-PAPS complex: evidence for catalytic role of Ser137 in the sulfuryl transfer reaction. *The Journal of biological chemistry*. 2002;277(20):17928-32. Epub 2002/03/09. doi: 10.1074/jbc.M111651200. PubMed PMID: 11884392.
25. Gorokhov A, Negishi M, Johnson EF, **PEDERSEN LC**, Perera L, Darden TA, Pedersen LG. Explicit water near the catalytic I helix Thr in the predicted solution structure of CYP2A4. *Biophysical journal*. 2003;84(1):57-68. Epub 2003/01/14. doi: 10.1016/s0006-3495(03)74832-2. PubMed PMID: 12524265; PMCID: PMC1302593.
26. Inoue K, Sobhany M, Transue TR, Oguma K, **PEDERSEN LC**, Negishi M. Structural analysis by X-ray crystallography and calorimetry of a haemagglutinin component (HA1) of the progenitor toxin from *Clostridium botulinum*. *Microbiology (Reading, England)*. 2003;149(Pt 12):3361-70. Epub 2003/12/10. doi: 10.1099/mic.0.26586-0. PubMed PMID: 14663070.
27. Lee KA, Fuda H, Lee YC, Negishi M, Strott CA, **PEDERSEN LC**. Crystal structure of human cholesterol sulfotransferase (SULT2B1b) in the presence of pregnenolone and 3'-phosphoadenosine 5'-phosphate. Rationale for specificity differences between prototypical SULT2A1 and the SULT2BG1 isoforms. *The Journal of biological chemistry*. 2003;278(45):44593-9. Epub 2003/08/19. doi: 10.1074/jbc.M308312200. PubMed PMID: 12923182.
28. Mueller SO, Hall JM, Swope DL, **PEDERSEN LC**, Korach KS. Molecular determinants of the stereoselectivity of agonist activity of estrogen receptors (ER) alpha and beta. *The Journal of biological chemistry*. 2003;278(14):12255-62. Epub 2003/01/28. doi: 10.1074/jbc.M203578200. PubMed PMID: 12547836.
29. **PEDERSEN LC**, Dong J, Taniguchi F, Kitagawa H, Krahn JM, Pedersen LG, Sugahara K, Negishi M. Crystal structure of an alpha 1,4-N-acetylhexosaminyltransferase (EXTL2), a member of the exostosin gene family involved in heparan sulfate biosynthesis. *The Journal of biological chemistry*. 2003;278(16):14420-8. Epub 2003/02/04. doi: 10.1074/jbc.M210532200. PubMed PMID: 12562774.
30. Shevtsov S, Petrotchenko EV, **PEDERSEN LC**, Negishi M. Crystallographic analysis of a hydroxylated polychlorinated biphenyl (OH-PCB) bound to the catalytic estrogen binding site of human estrogen sulfotransferase. *Environmental health perspectives*. 2003;111(7):884-8. Epub 2003/06/05. PubMed PMID: 12782487; PMCID: PMC1241520.
31. Edavettal SC, Carrick K, Shah RR, **PEDERSEN LC**, Tropsha A, Pope RM, Liu J. A conformational change in heparan sulfate 3-O-sulfotransferase-1 is induced by binding to heparan sulfate. *Biochemistry*. 2004;43(16):4680-8. Epub 2004/04/21. doi: 10.1021/bi0499112. PubMed PMID: 15096036.
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33. Garcia-Diaz M, Bebenek K, Krahn JM, Blanco L, Kunkel TA, **PEDERSEN LC**. A structural solution for the DNA polymerase lambda-dependent repair of DNA gaps with minimal homology. *Molecular cell*. 2004;13(4):561-72. Epub 2004/03/03. PubMed PMID: 14992725.
34. Moon AF, Edavettal SC, Krahn JM, Munoz EM, Negishi M, Linhardt RJ, Liu J, **PEDERSEN LC**. Structural analysis of the sulfotransferase (3-o-sulfotransferase isoform 3) involved in the biosynthesis of an entry receptor for herpes simplex virus 1. *The Journal of biological chemistry*. 2004;279(43):45185-93. Epub 2004/08/12. doi: 10.1074/jbc.M405013200. PubMed PMID: 15304505; PMCID: PMC4114238.
35. Batra VK, Beard WA, Shock DD, **PEDERSEN LC**, Wilson SH. Nucleotide-induced DNA polymerase active site motions accommodating a mutagenic DNA intermediate. *Structure (London, England : 1993)*. 2005;13(8):1225-33. Epub 2005/08/09. doi: 10.1016/j.str.2005.05.010. PubMed PMID: 16084394.

36. Chen J, Avci FY, Munoz EM, McDowell LM, Chen M, **PEDERSEN LC**, Zhang L, Linhardt RJ, Liu J. Enzymatic redesigning of biologically active heparan sulfate. *The Journal of biological chemistry*. 2005;280(52):42817-25. Epub 2005/11/02. doi: 10.1074/jbc.M504338200. PubMed PMID: 16260789; PMCID: PMC4140617.
37. Garcia-Diaz M, Bebenek K, Gao G, **PEDERSEN LC**, London RE, Kunkel TA. Structure-function studies of DNA polymerase lambda. *DNA repair*. 2005;4(12):1358-67. Epub 2005/10/11. doi: 10.1016/j.dnarep.2005.09.001. PubMed PMID: 16213194.
38. Garcia-Diaz M, Bebenek K, Krahn JM, Kunkel TA, **PEDERSEN LC**. A closed conformation for the Pol lambda catalytic cycle. *Nature structural & molecular biology*. 2005;12(1):97-8. Epub 2004/12/21. doi: 10.1038/nsmb876. PubMed PMID: 15608652.
39. Ghosh M, Meiss G, Pingoud A, London RE, **PEDERSEN LC**. Structural insights into the mechanism of nuclease A, a betabeta alpha metal nuclease from Anabaena. *The Journal of biological chemistry*. 2005;280(30):27990-7. Epub 2005/05/18. doi: 10.1074/jbc.M501798200. PubMed PMID: 15897201.
40. Prasad R, Batra VK, Yang XP, Krahn JM, **PEDERSEN LC**, Beard WA, Wilson SH. Structural insight into the DNA polymerase beta deoxyribose phosphate lyase mechanism. *DNA repair*. 2005;4(12):1347-57. Epub 2005/09/21. doi: 10.1016/j.dnarep.2005.08.009. PubMed PMID: 16172026.
41. Ueda A, Matsui K, Yamamoto Y, **PEDERSEN LC**, Sueyoshi T, Negishi M. Thr176 regulates the activity of the mouse nuclear receptor CAR and is conserved in the NR1I subfamily members PXR and VDR. *The Biochemical journal*. 2005;388(Pt 2):623-30. Epub 2004/12/22. doi: 10.1042/bj20041572. PubMed PMID: 15610065; PMCID: PMC1138970.
42. Batra VK, Beard WA, Shock DD, Krahn JM, **PEDERSEN LC**, Wilson SH. Magnesium-induced assembly of a complete DNA polymerase catalytic complex. *Structure (London, England : 1993)*. 2006;14(4):757-66. Epub 2006/04/18. doi: 10.1016/j.str.2006.01.011. PubMed PMID: 16615916; PMCID: PMC1868394.
43. Batra VK, Shock DD, Prasad R, Beard WA, Hou EW, **PEDERSEN LC**, Sayer JM, Yagi H, Kumar S, Jerina DM, Wilson SH. Structure of DNA polymerase beta with a benzo[c]phenanthrene diol epoxide-adducted template exhibits mutagenic features. *Proceedings of the National Academy of Sciences of the United States of America*. 2006;103(46):17231-6. Epub 2006/11/03. doi: 10.1073/pnas.0605069103. PubMed PMID: 17079493; PMCID: PMC1630674.
44. Garcia-Diaz M, Bebenek K, Krahn JM, **PEDERSEN LC**, Kunkel TA. Structural analysis of strand misalignment during DNA synthesis by a human DNA polymerase. *Cell*. 2006;124(2):331-42. Epub 2006/01/28. doi: 10.1016/j.cell.2005.10.039. PubMed PMID: 16439207.
45. Kirby TW, Harvey S, DeRose EF, Chalov S, Chikova AK, Perrino FW, Schaaper RM, London RE, **PEDERSEN LC**. Structure of the Escherichia coli DNA polymerase III epsilon-HOT proofreading complex. *The Journal of biological chemistry*. 2006;281(50):38466-71. Epub 2006/09/16. doi: 10.1074/jbc.M606917200. PubMed PMID: 16973612; PMCID: PMC1876720.
46. Lin P, **PEDERSEN LC**, Batra VK, Beard WA, Wilson SH, Pedersen LG. Energy analysis of chemistry for correct insertion by DNA polymerase beta. *Proceedings of the National Academy of Sciences of the United States of America*. 2006;103(36):13294-9. Epub 2006/08/30. doi: 10.1073/pnas.0606006103. PubMed PMID: 16938895; PMCID: PMC1569157.
47. Picher AJ, Garcia-Diaz M, Bebenek K, **PEDERSEN LC**, Kunkel TA, Blanco L. Promiscuous mismatch extension by human DNA polymerase lambda. *Nucleic acids research*. 2006;34(11):3259-66. Epub 2006/06/30. doi: 10.1093/nar/gkl377. PubMed PMID: 16807316; PMCID: PMC1904104.
48. Garcia-Diaz M, Bebenek K, Krahn JM, **PEDERSEN LC**, Kunkel TA. Role of the catalytic metal during polymerization by DNA polymerase lambda. *DNA repair*. 2007;6(9):1333-40. Epub 2007/05/04. doi: 10.1016/j.dnarep.2007.03.005. PubMed PMID: 17475573; PMCID: PMC1989765.
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PMCID: PMC2072808.

50. McKenna CE, Kashemirov BA, Upton TG, Batra VK, Goodman MF, **PEDERSEN LC**, Beard WA, Wilson SH. (R)-beta,gamma-fluoromethylene-dGTP-DNA ternary complex with DNA polymerase beta. *Journal of the American Chemical Society*. 2007;129(50):15412-3. Epub 2007/11/23. doi: 10.1021/ja072127v. PubMed PMID: 18031037; PMCID: PMC2677377.
51. Moon AF, Garcia-Diaz M, Bebenek K, Davis BJ, Zhong X, Ramsden DA, Kunkel TA, **PEDERSEN LC**. Structural insight into the substrate specificity of DNA Polymerase mu. *Nature structural & molecular biology*. 2007;14(1):45-53. Epub 2006/12/13. doi: 10.1038/nsmb1180. PubMed PMID: 17159995.
52. Sucato CA, Upton TG, Kashemirov BA, Batra VK, Martinek V, Xiang Y, Beard WA, **PEDERSEN LC**, Wilson SH, McKenna CE, Florian J, Warshel A, Goodman MF. Modifying the beta,gamma leaving-group bridging oxygen alters nucleotide incorporation efficiency, fidelity, and the catalytic mechanism of DNA polymerase beta. *Biochemistry*. 2007;46(2):461-71. Epub 2007/01/11. doi: 10.1021/bi061517b. PubMed PMID: 17209556.
53. Xu D, Song D, **PEDERSEN LC**, Liu J. Mutational study of heparan sulfate 2-O-sulfotransferase and chondroitin sulfate 2-O-sulfotransferase. *The Journal of biological chemistry*. 2007;282(11):8356-67. Epub 2007/01/18. doi: 10.1074/jbc.M608062200. PubMed PMID: 17227754.
54. Batra VK, Beard WA, Shock DD, **PEDERSEN LC**, Wilson SH. Structures of DNA polymerase beta with active-site mismatches suggest a transient abasic site intermediate during misincorporation. *Molecular cell*. 2008;30(3):315-24. Epub 2008/05/13. doi: 10.1016/j.molcel.2008.02.025. PubMed PMID: 18471977; PMCID: PMC2399898.
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58. Mueller GA, Moon AF, Derose EF, Havener JM, Ramsden DA, **PEDERSEN LC**, London RE. A comparison of BRCT domains involved in nonhomologous end-joining: introducing the solution structure of the BRCT domain of polymerase lambda. *DNA repair*. 2008;7(8):1340-51. Epub 2008/07/01. doi: 10.1016/j.dnarep.2008.04.018. PubMed PMID: 18585102; PMCID: PMC2583787.
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60. Ullah H, Scappini EL, Moon AF, Williams LV, Armstrong DL, **PEDERSEN LC**. Structure of a signal transduction regulator, RACK1, from *Arabidopsis thaliana*. *Protein science : a publication of the Protein Society*. 2008;17(10):1771-80. Epub 2008/08/22. doi: 10.1110/ps.035121.108. PubMed PMID: 18715992; PMCID: PMC2548356.
61. Xu D, Moon AF, Song D, **PEDERSEN LC**, Liu J. Engineering sulfotransferases to modify heparan sulfate. *Nature chemical biology*. 2008;4(3):200-2. Epub 2008/01/29. doi: 10.1038/nchembio.66. PubMed PMID: 18223645; PMCID: PMC2676843.
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mutant with reduced fidelity and increased translesion synthesis capacity. *Nucleic acids research*. 2008;36(12):3892-904. Epub 2008/05/27. doi: 10.1093/nar/gkn312. PubMed PMID: 18503083; PMCID: PMC2475618.

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