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## Finger printing in low molecular weight heparins for regulating quality and equivalence

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The unparalleled structural complexity of low molecular weight heparins (LMWHs) is a major problem in regulating this important class of anticoagulants. We have developed a capillary electrophoresis-based fingerprinting approach to profile LMWHs' microscopic differences and batch-to-batch variability. This approach relies on the ability of linear polyalkylamines to transform a broad featureless electropherogram of a LMWH into a large number of distinct, highly reproducible peaks that reflect the microscopic composition of the anticoagulant product. Thus, linear polyalkylamines led to a characteristic profile of Lovenox that was distinct from Innohep. Fingerprinting leads to baseline resolution of a number of peaks, which implies that coupling to a mass spectrometer may lead to complete sequencing of selected chains of LMWHs. An added advantage of this method is that dermatan sulfate, chondroitin sulfate or oversulfated chondroitin sulfate are not fingerprinted by the resolving agents, while unfractionated heparin interacts far too strongly. Thus, the method could aid identification of common contaminants. The fingerprinting approach has major implications in routinely assessing batch-to-batch variability and compositional equivalence of these complex glycosaminoglycans.

### Biography

Dr. Desai is a professor of Medicinal Chemistry in the School of Pharmacy at Virginia Commonwealth University, Richmond, VA. He received his baccalaureate from the M. S. University of Baroda, and his M.S. and Ph.D. from the Indian Institute of Technology, Bombay, India. Following postdoctoral work with Professor Linhardt at the University of Iowa and Professor Klibanov at the Massachusetts Institute of Technology, he returned to his alma mater Indian Institute of Technology in 1994 as a faculty member. In 1996 he moved to the US to work on the mechanism of heparin activation of antithrombin with Prof. Steven T. Olson at University of Illinois, Chicago. At the completion of the American Heart Association project in 1998, Dr. Desai accepted an assistant professorship at VCU. He specializes in drug design and discovery with emphasis on macromolecular and small-molecule mechanism-based anticoagulants. He received a Beginning Grant-in-Aid award and Established Investigator Award from the American Heart Association in 1999 and 2006, respectively, and Faculty Research and Teaching awards from VCU in 2003 and 2010, respectively.