

## Design of novel rho kinase inhibitors for the treatment of diabetic complications using energy based pharmacophore modeling, in-silico screening and docking studies

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Rho kinase (ROCK) is a serine/threonine kinase, which is activated by binding with the activated form of a low molecular weight G protein, Rho. ROCK plays important roles in a variety of cellular functions such as cell motility, smooth muscle contraction and cytoskeletal reorganisation of non-muscle cells. ROCK inhibitors have been considered to be a target for potential treatment of diabetic complications like diabetic neuropathy, nephropathy, erectile dysfunction, hypertension, retinopathy and injury caused by ischaemia and reperfusion. A number of synthetic inhibitors of the ROCK have been developed recently. In this study, energy-based pharmacophore model and molecular docking approach were used to characterize the binding features of three different Rho kinase (ROCK) inhibitors. The energy based pharmacophores were generated using E-pharmacophore module of Schrodinger suit of softwares. The pharmacophore models thus generated had acceptor and aromatic feature and a presence of aryl ring system seemed to be essential for inhibitors in term of their binding affinities. The energy based pharmacophores were then used for virtual screening and the top hits were docked. Here, on the basis of pharmacophore modelling, virtual screening and molecular docking studies, we report possible pharmacophores and a series of ROCK inhibitors which might be valuable for designing new ROCK inhibitors.

### Biography

Ram Kumar Mishra is a Ph.D. student under Dr. P. Yogeewari at Department of Pharmacy, Birla Institute of Technology & Science-Pilani (BITS-Pilani), Hyderabad Campus since January, 2011. He did his M. Pharm. from BITS-Pilani, Pilani Campus. He spent two years at University of North Carolina at Greensboro (UNCG), Greensboro, NC, USA and at University Health Networks (UHN), Toronto, ON, CANADA as an exchange student. Recently he was awarded senior research fellowship from Council of Scientific and Industrial Research (CSIR), India. He published 2 papers in reputed journals and shares his name in a patent with Dr. P. Yogeewari.

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