MUSE INVENT: Automated Reaction Driven Molecular Inventions Applied on a Fragment Growing Example

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Successful drug discovery often requires optimization against a set of biological and physical properties. Muse Invent is a molecular invention tool that operates on an initial population of structures for the invention of new structures with improved characteristics. It is possible to combine almost any property calculation and scoring function to guide the invention process to molecules that are in accordance with the desired attributes. Ligand- and structure-based methods may be applied as well as a combination of them.

Molecular invention experiments on PPAR-γ will be presented in order to grow a thiazolidinedione fragment back into full molecules. A "reaction driven" evolutionary algorithm approach to de novo molecular design was applied to generate new structures and propose a synthesis path at the same time intended to aid the medicinal chemist in assessing the synthetic feasibility of the ideas that are generated.

Reactions can be adjusted to make use of specific chemistry or fragments. The methodology for reaction driven molecular evolution we have developed is independent of how the design ideas are scored..