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Chiral molecules can exist in two enantiomeric forms, i.e. molecules that are mirror images of each other. In most cases, the enantiomers display different biological activities and, therefore, it is necessary to synthesize one enantiomer in pure form. This task is of importance for the production of pharmaceuticals and fragrances. An economically and ecologically advantageous solution of the synthetic problem is provided by enantioselective catalysis. The research leading to my PhD thesis was part of the development of a catalytic enantioselective method that is based on an iridium catalyst. Applying the method, an enantioselective construction of five-membered carbocycles, a very important naturally occurring structural motive, was developed. Another access to five-membered carbocycles was found unexpectedly, a novel reaction based on a gold catalyst. The reaction allows forming complex molecules from simple starting materials and is interesting in terms of mechanistic aspects in the currently intensively investigated field of gold catalysis.