Azines – Reactions and Ring Synthesis

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The synthesis of a particular target heterocycle can sometimes be achieved by purchasing a commercially available material and manipulating its functionalities. Sometimes, however, it is necessary to construct the heterocyclic ring from commercial precursors that do not contain the heterocyclic system and then afterwards, if necessary, manipulate the substituents, i.e. to carry out a heterocyclic ring synthesis. This course will cover both these aspects of the chemistry of pyridines, and their benzo-fused analogues, quinolines and isoquinolines.

The first part of the course will deal with the manipulation of the ring and substituents thereon following the principles of azine chemistry, which will be explained. Electrophilic and nucleophilic *C*-substitutions and the great variety of opportunities that are provided by interactions with the electron pair on nitrogen will be explained and exemplified. The conversion of these heterocycles into reduced and partially reduced derivatives (piperidines etc.) will be described. Ring- and side-chain-lithiations will not be covered in detail, since these very significant methodologies will be discussed in another of the short courses, given by Professor Gribble. The importance of palladium-catalysed couplings will also not be dealt with in detail since, again, such processes are covered in Professor Gribble's course.

The second part of this course will discuss the principles and give examples of the synthesis of six-membered heterocycles from compounds that do not contain a heterocyclic ring. There are of course many routes for each of these heterocyclic ring systems; instances of the most useful and the most used routes to the pyridines, quinolines and isoquinolines will be presented. This part of the course

will conclude with examples of very recent and novel strategies for the ring synthesis of azines and with some examples taken from the recent medicinal literature, of the preparation of pyridine-containing drugs.