The job of a synthetic chemist is akin to that of an architect. While the architect could actually see the building he is constructing, a molecular architect called chemist is handicapped by the fact that the molecule he is synthesizing is too small to be seen. With such a limitation, how does he ‘see’ the developing structure? For this purpose, a chemist makes use of spectroscopic tools. How does he cut, tailor and glue the components on a molecule that he cannot see? For this purpose chemists have developed molecular level tools called Reagents and Reactions. How does he clean the debris and produce pure molecules? This feat is achieved by crystallization, distillation and extensive use of Chromatography techniques. A mastery over several such techniques enables the molecular architect (popularly known as organic chemist) to achieve the challenging task of synthesizing the myriade of molecular structures encountered in Natural Products Chemistry, Drug Chemistry and modern Molecular Materials. In this task, organic chemists are further guided by several ‘thumb rules’ that chemists have evolved over the past two centuries.
3: Criteria for Selection of the Synthetic Route

4: The Logic of Synthesis

5: Strategies in Disparlure Synthesis

6: Strategies in (-)-Menthol Synthesis
7: Strategies in Longfolene Synthesis

8: Strategies in Cedrene Synthesis

9: Strategies in Reserpine Synthesis

10: Strategies in Prostaglandins Synthesis
11: Strategies in Steroids Synthesis

- 12: Woodward’s Synthesis of Chlorophyll

- 13: Synthesis of Vitamin B₁₂

- 14: Green Chemistry - Protection-Free Organic Synthesis
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Thumbnail: Ball-and-stick model of a prednisolone molecule, \(\text{\ce{C21H28O5}}\), as found in the crystal structure available as CSD entry JIWPEL01. (Public Domain; Ben Mills via Wikipedia)