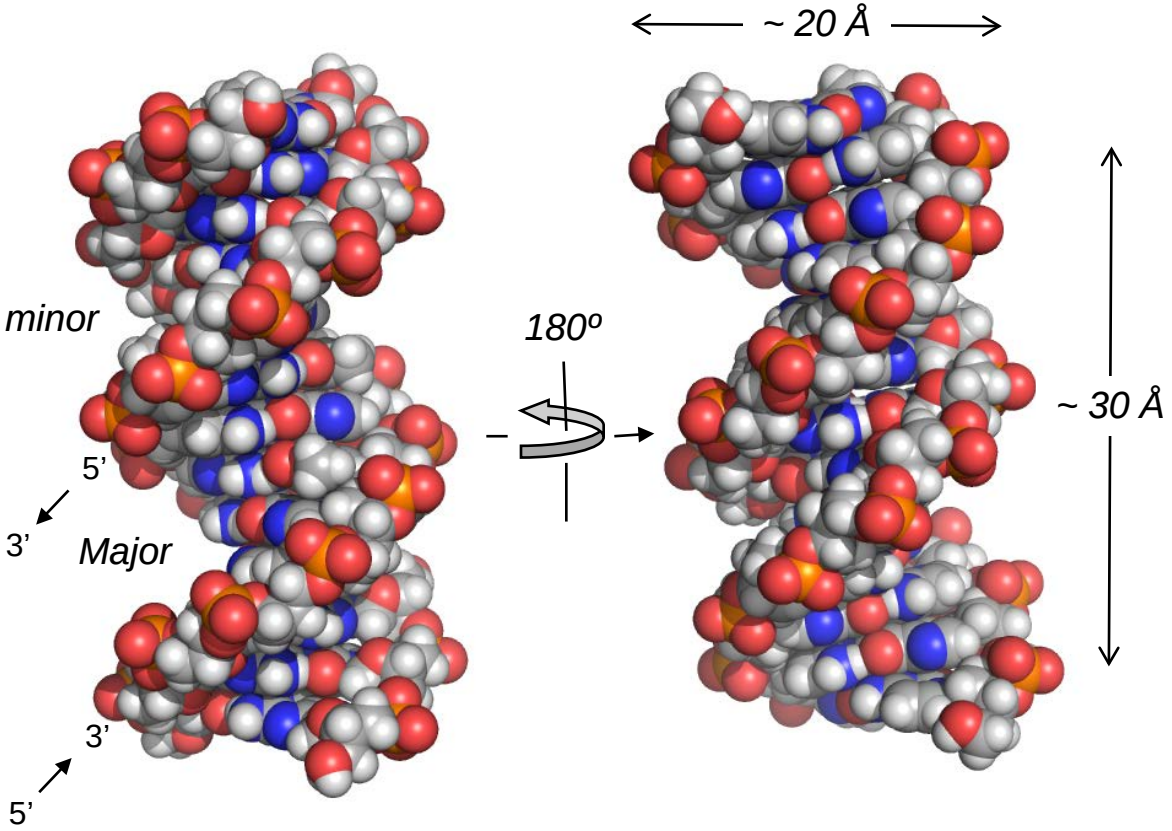
Sequence recognition

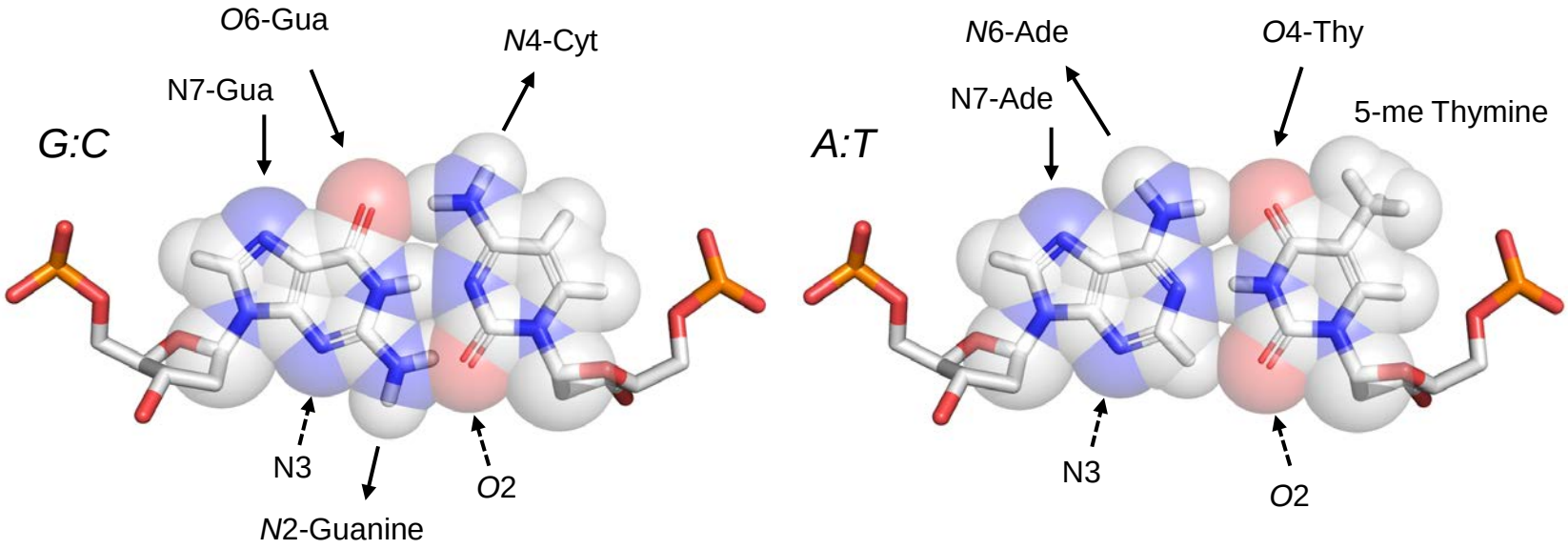
—the substrate



- The base pairs are planar and stack with a -36˚ offset. The molecule is a right-handed anti-parallel spiral with one wide groove (‘major’) and one narrow groove (‘minor’)
- The surfaces of the grooves are irregular. Each base pair has a unique shape and charge

Sequence recognition

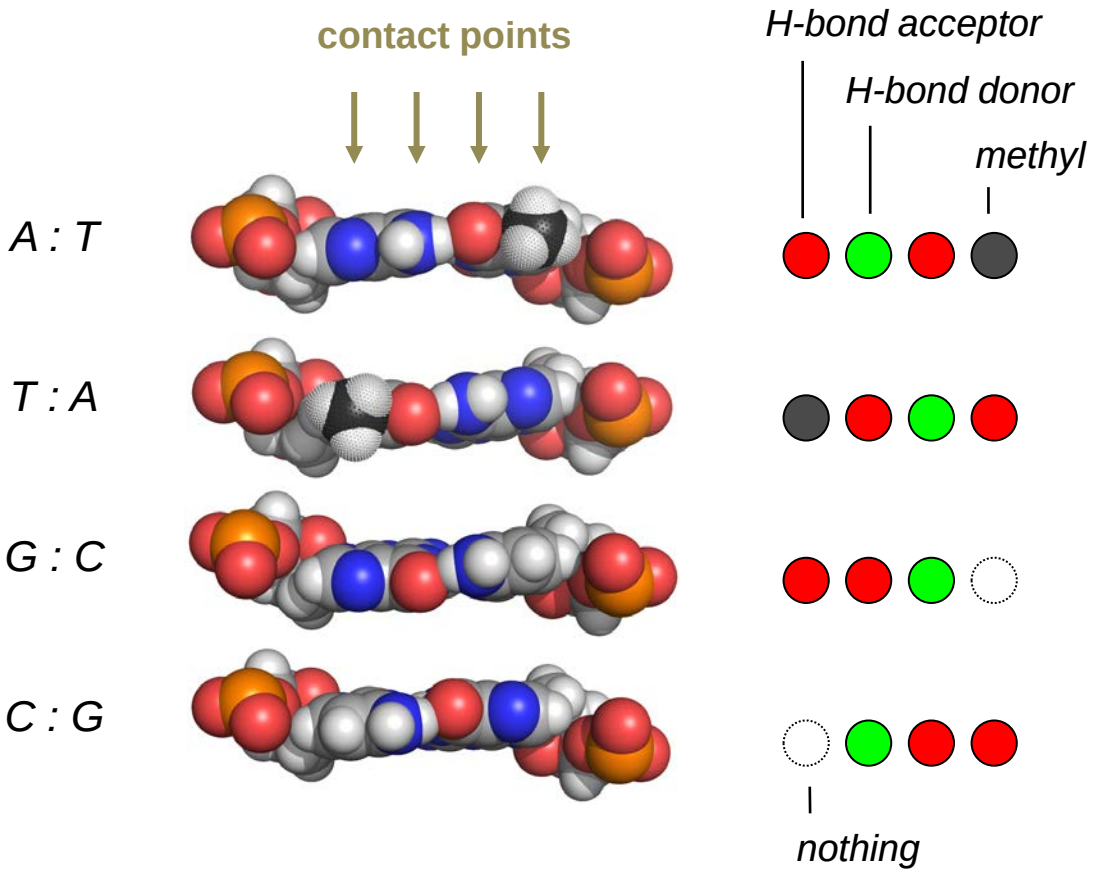
—the base pairs



- Each base pair has a unique arrangement of H-bond donor and acceptor atoms
- Those in the major groove are unique to each bp. Those in the minor groove are ambiguous

Sequence recognition

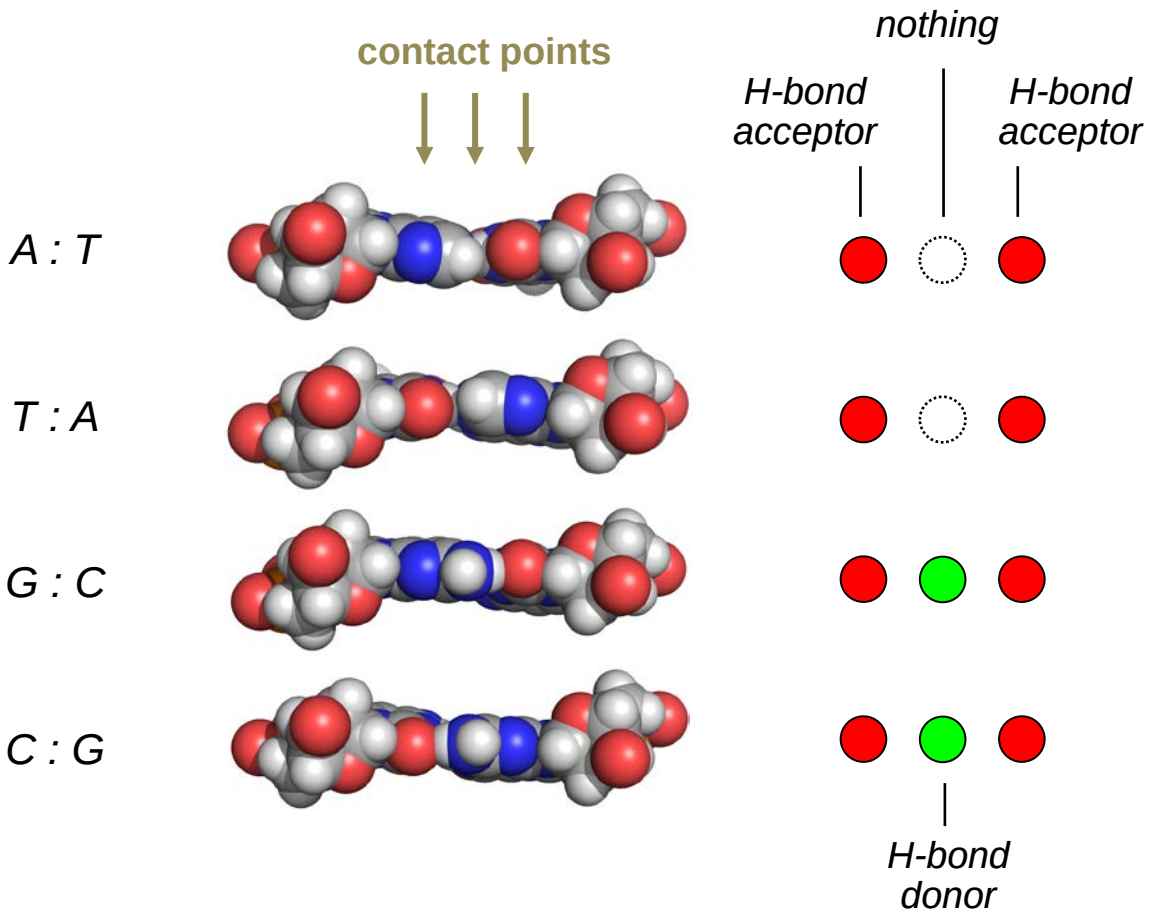
—four major-groove contacts



- Each ‘contact point’ has several possible states: donor, acceptor, methyl, or nothing
- Each base-pair has a unique set of states which could permit unique discrimination

Sequence recognition

—three minor-groove contacts



- The minor groove is less ‘informative’
- Indistinguishable, symmetric, H-bond acceptors. Symmetric *N*2-Guanine donor