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**Atomic Force Microscopy in Structural Biology.** A. McPherson, Dept. of Molecular Biology and Biochemistry, The Univ. of California Irvine, Irvine, CA 92697-3900 USA.

Atomic force microscopy (AFM) is relatively new to structural biology, achieving some degree of popularity only in the past five years. It is one of several probe microscopy techniques that emerged from the field of physics. It has the unique virtues of being able to operate in fluid medium, is non perturbing and non destructive, scans on a time frame compatible with many active processes, and is able to visualize objects of the order of individual proteins, nucleic acids, and viruses. We subsequently explored the use of AFM for the investigation of living cells, then cells infected with viruses, and now individual virus particles. Even with current technology, AFM allows the resolution of surface features on macromolecular complexes of one to two nanometers, adequate to see the capsomeres on virus capsids of 30 to 200 nm diameter, clusters of proteins on retroviral surfaces, and the emergence of nucleic acid from the virions. In conjunction with controlled disruption of viruses by chemical or enzymatic means it allows the investigator to see internal structure as well. AFM allows one to take the results of X-ray crystallography, macromolecular structure, and extend it upwards to nanoscale complexes, and even organelles.