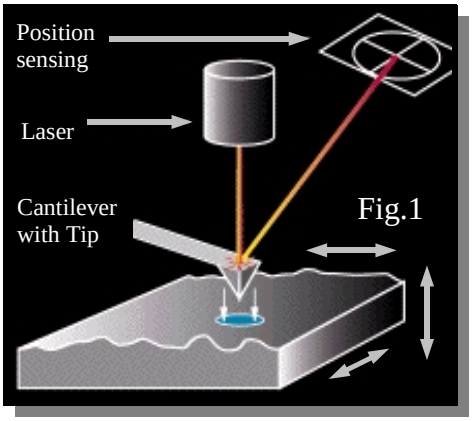
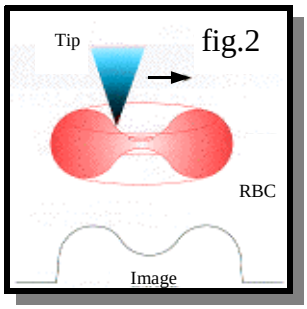
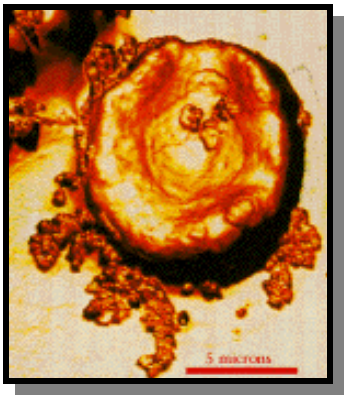
MICROSCOPE IMAGES IN YOUR WORLD





AFM scanning



A Red blood cell

Not all modern day microscope techniques use optical lenses to magnify the image. Lasers, sophisticated mechanics and software programmes are all now used to create images for researchers.
An example of this is an **A**tomic **F**orce **M**icroscope.

The above diagram, fig.1, illustrates the working of "contact mode" A.F.M. as is in practice at two universities in South Africa.
A split photodetector senses the movement of a laser beam reflected from the back of a cantilever. As the sample is rastered under the sharp tip, fig.2, the cantilever bends in response to the topography. The photodetector, by comparing the amount of reflected laser light falling on the various quadrant, senses the amount of bending. The sample is then scanned under the tip to maintain a constant bend on the catilever. The amount the sample must be scanned up and down is fed into a computer and develops an image.

Red Blood Cells (RBCs) have been extensively studied over the years because of their relatively simple structure and ease of isolation. The RBC's are biconcave in shape with an approximate thickness of 2-3 microns and a diameter of around 7.0 microns. An understanding of these cells is important because of their function in transporting oxygen to, and carbon dioxide away from, all the tissues in the body. This is achieved due to the large quantity of the protein haemoglobin that is contained in the cell.
It is not understood how the RBC's withstand the large shear forces they experience while passing through the capillaries of the vascular system. It is believed that spectrin, actin, and Band 4.1 proteins are responsible for the mechanical stability of the cell. While considerable progress has been achieved using the electron microscope to determine the arrangement of the proteins, the technique of AFM allows researchers to scan dynamic events under physiological conditions and therefore shed new light on the RBC structure and function.

Thus a new technique to answer some old questions and pose a few new ones.

This information is brought to you by the Microscopy Society of Southern Africa in the interest of furthering research, awareness and development of microscopy in the region.

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web site: http://www.microscopy.org.za