

***The Nano Revolution, 2: More Than Human*** (DVD; 45 minutes; Bullfrog Films, 2011; <http://www.bullfrogfilms.com>)

*More Than Human* is the second DVD in the series “The Nano Revolution.” Originally produced as part of a television program, *The Nature of Things*, the film showcases a number of ways that nanotechnology could change the face of contemporary medicine. With nanotechnology – science at the molecular level – the possibilities of greater control of our bodies and environment may be just around the corner, extending life and revolutionizing medicine. As in science fiction, nanotechnology may also lead to unexpected consequences; many new questions will need to be answered.

This outstanding program features several applications of nanotechnology, such as its use in the detection of diseases at their earliest stages, as well as the diagnosis of genetic predispositions to certain conditions. Early signs of disease actually occur at the nanometric level—where all diseases and conditions have unique cellular markers. Simple automated diagnostic procedures are now capable of detecting the markers of several pathogens and predispositions. For example, during the 2009 outbreak of the H1N1 strain of influenza, researchers used nanotechnology that detected the virus within four hours of infection, as compared to the usual two weeks required when using traditional diagnostic processes.

The idea of a “magic bullet” that could target a particular disease was suggested more than a century ago. It may soon become a reality with new delivery mechanisms of medicine. In a cutting-edge use of nanotechnology, clinical trials are already in progress for cancer chemotherapy, using nanoparticles that wander through the body and target tumor cells without harming normal cells. To avoid having the drug-loaded particles

attacked by natural body defenses, scientists have devised a way to surround them with water molecules, making them invisible to the immune system.

The “brave new world” of nanotechnology will undoubtedly improve patients’ quality of life as medicine becomes less invasive and more personalized, but repercussions may loom. Large corporations heavily bankroll research in this technology, and many of these beneficial developments are subject to patents. This leads to wondering whether these groundbreaking techniques will be available to everyone equally. As stated in the video, the nanotechnology revolution is “little known beyond the lab and big business, and its future is difficult to predict.”

This intense, rapidly moving, and highly engaging film would be a good resource in a high school or college biology class. The explanations are clear, and many of the techniques are demonstrated by the scientists who developed them. Striking animations depict the nano-level processes. After viewing the DVD, students may wish to discuss what they have observed, such as the interaction between science and business in research, predictions of possible applications of medical nanotechnology in their lifetimes, the ethics of keeping people alive almost indefinitely by rebuilding their bodies, and even career possibilities.

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***Great Discoveries in Science: The Double Helix*** (Short film; 17 minutes; HHMI BioInteractive; <http://www.hhmi.org/biointeractive/great-discoveries-science-double-helix>)

This film provides an excellent summary of how James Watson and Francis Crick discovered

the molecular structure of DNA. It packs a tremendous amount of information into a short time frame. Hosted by science journalist Olivia Judson, the video contains interviews with Watson and Crick, as well as Sean Carroll (University of Wisconsin-Madison/HHMI), Karolin Luger (Colorado State/HHMI), Robert Olby (Historian/Biographer), and others. Quite a bit of seldom-seen archival footage is used.

Viewers will follow Watson and Crick’s progress toward their famous discovery. They will also learn about some of the mistakes the researchers made along the way. Maurice Wilkins and Rosalind Franklin do not go unmentioned, though a description of the controversy surrounding Franklin’s role is absent. Nevertheless, her work’s contribution to the discovery is highlighted. Also included is Linus Pauling’s attempt to beat Watson and Crick to the outline of the DNA structure.

This short film can be viewed online at the HHMI website or can be ordered for free on DVD. It is short enough to keep the attention of both high school and college students. I believe that even middle school students would enjoy it. I highly recommend this video for classroom use and plan to use it in my own.

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