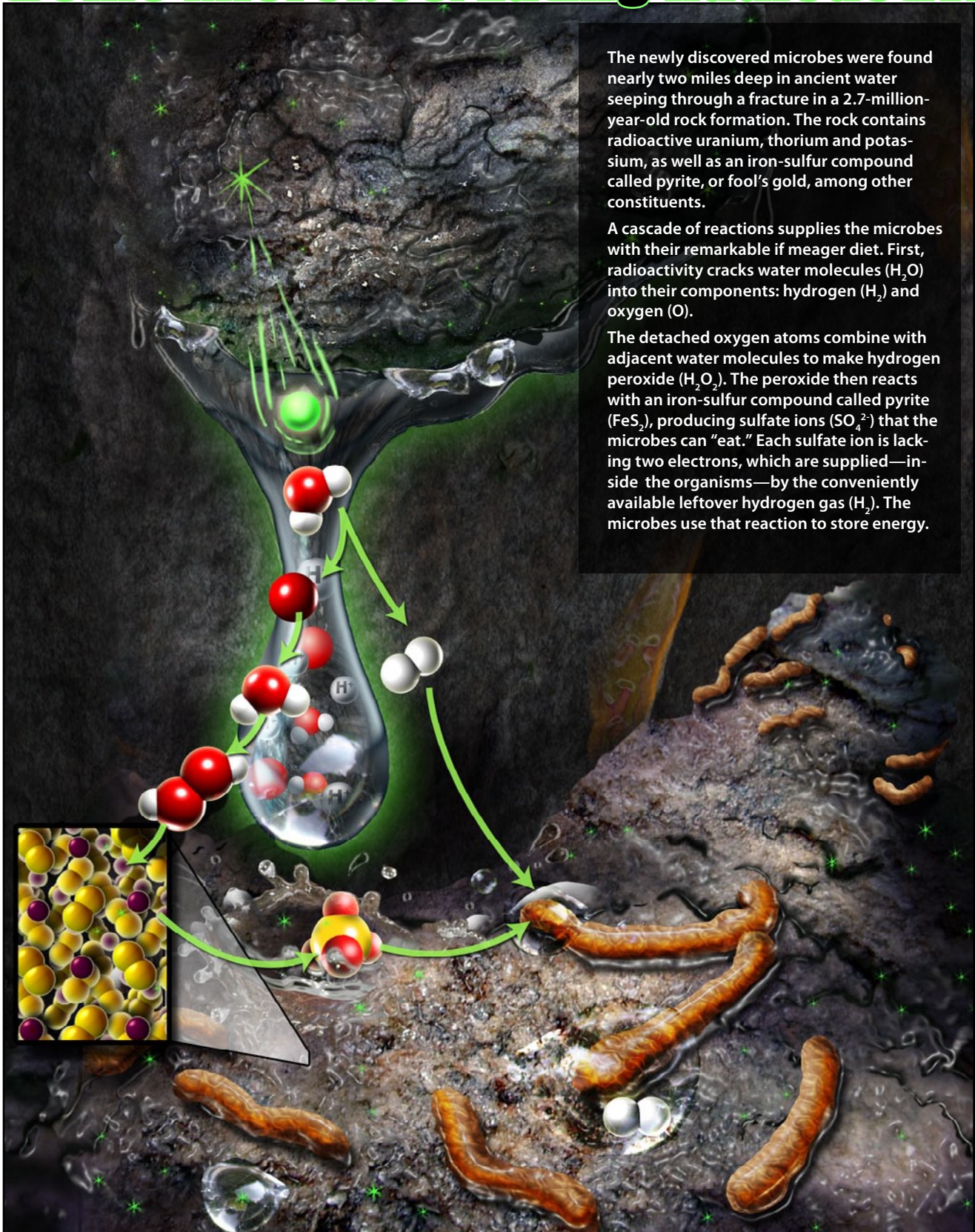


X-treme Microbes: Eating Radioactivity



The newly discovered microbes were found nearly two miles deep in ancient water seeping through a fracture in a 2.7-million-year-old rock formation. The rock contains radioactive uranium, thorium and potassium, as well as an iron-sulfur compound called pyrite, or fool's gold, among other constituents.

A cascade of reactions supplies the microbes with their remarkable if meager diet. First, radioactivity cracks water molecules (H_2O) into their components: hydrogen (H_2) and oxygen (O).

The detached oxygen atoms combine with adjacent water molecules to make hydrogen peroxide (H_2O_2). The peroxide then reacts with an iron-sulfur compound called pyrite (FeS_2), producing sulfate ions (SO_4^{2-}) that the microbes can "eat." Each sulfate ion is lacking two electrons, which are supplied—inside the organisms—by the conveniently available leftover hydrogen gas (H_2). The microbes use that reaction to store energy.

Credit: Nicolle Rager Fuller, National Science Foundation

For more information on X-treme Microbes see:
www.nsf.gov/news/special_reports/microbes/index.jsp

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