A nonlinear miniaturized microscope is presented which can be used for in vivo tissue imaging. The microscope utilizes a novel, single-lens, high-resolution electromagnetically-controlled fiber-scanning system with a 3 mm outer diameter. The scanner can work both in resonant and non-resonant mode. The scanner is fiber coupled to the rest of the microscope using a double clad photonic crystal fiber. This facilitates signal guiding of both single-mode infrared excitation and broadband multimode visible emission. The group velocity dispersion of the excitation light by the fiber is pre-compensated with a grating based compensator. Emission is detected using a custom built spectrograph with a sensitive EM (electron multiplication) CCD for fast (10 kHz spectral rate) spectral detection.[1] The nonlinear excitation provides contrast without applying stains in living tissue. Signals are detected from, amongst others, auto-fluorescence of NADH, FAD, melanin, and second harmonic generation of collagen. Tests and first results on tissue are shown.