Imaging of living cells in their physiological surrounding without staining or labeling them is a highly sought after capability in life science. Confocal Raman Microscopy combines high resolution microscopy with the chemical sensitivity of Raman spectroscopy, thus allowing nondestructive imaging of chemical properties without special sample preparation. Due to the confocal principle, depth information on the materials can be easily obtained. Not only can thickness and uniformity measurements be performed, but the degree of mixing or segregation of the ingredients within the materials can also be determined. In Raman microscopy of complex biological systems, the inherent vibrational spectroscopic signatures of biochemical constituents of cells are observed. Raman imaging permits the detection of Raman scattering from a small cell volume of about 0.3 x 0.3 x 1.3 µm³ depending on the excitation wave-length used in the experiment. This spatial resolution is comparable to that obtained in standard optical microscopy. In the example presented below, epithelial rat cells were investigated (a). A 2D array of 100x100 complete Raman spectra was recorded over a range of 40x40 µm² using a 60x Nikon (NA = 1) water objectiv @532 nm excitation. Characteristic Raman spectra for cells are shown in (b). These spectra were used to reconstruct the cell components as presented in (c). The color coded image of the unstained rat epithelial cell is shown in (d) where the nucleus, mitochondriae and more cell components become visible.