Human embryonic stem cells (hESC) have become an important model for studying embryonic development, drug testing and disease modelling. The abilities of hESC to self-renewal and differentiation into multiple specialized cells make them promising candidates also for regenerative medicine, such as tissue regeneration in Parkinson disease, spinal cord injuries, and many more. However, all the therapies require stem cell growth in precisely controlled conditions, which influence cell behavior through the contact of cell receptors with the environment. Surface receptors are important family of proteins responsible for modulation of many stem cell functions, such as cell adhesion, differentiation and migration. Understanding of the localization, structure and function of the surface receptors is important for designing robust niche for sustained growth of hESC. Correlative light and electron microscopy (CLEM) allows correlating functional data obtained by fluorescence microscopy with a structural data collected by a high-resolution scanning electron microscope (SEM) in the same region of interest. In this work, we use the CLEM approach for visualization of receptors on the surface of hESC cells. The cells were immunolabelled with a primary antibody against specific adhesion proteins and clusters of differentiation followed by labeling with combined fluorescent and gold conjugated secondary antibody. The cells were observed in the fluorescence microscope to localize the proteins on the cell surfaces. After the collection of fluorescence images, the cells were refixed with glutaraldehyde, silver enhanced, dehydrated and carbon coated. Finally, they were loaded into an ultra-high resolution SEM. The stage was navigated to the regions of interest selected previously by fluorescence microscopy. The specificity of the antibody labeling was confirmed by observing the silver enhanced nanoparticles in the backscattered electron detector. The structural information of the receptors was obtained using the secondary electron signals. A dedicated software module for correlative microscopy (TESCAN Coral) was used to correlate the data from both sources in real time. Using this approach, changes in the structure of the receptors are being studied in respect to different extracellular conditions of the hESC culture.