High-Resolution Visualization of Active Chromatin using an H2B-Enhanced GFP Fusion Reporter

Technology #2983

“Lead Inventors: Virginia E. Papaioannou, Ph.D.; Anna-Katarina Hadjantonakis, Ph. D.

Selective Visualization of Chromatin Needed for Targeting Proteins Expressed within Nucleus Fluorescent reporter proteins such as GFP are widely used for imaging of live or fixed cells. Volumetric visualization of cells and the visual tracking of cell movement or division requires the use of easily identifiable tags that are visible at sub-cellular resolution in order to distinguish individual cells in a tagged population. One way this can be achieved is by targeting proteins expressed on conspicuous internal cell structures such as the nucleus for fluorescent labeling. Because chromatin is localized within the nucleus, selective visualization of the chromatin would achieve this goal.

Fusion of Human Histone Protein H2B and Fluorescent Reporter Proteins for Visualizing Active Chromatin The technology is a method for visualizing active chromatin in cells that employs a fusion of human histone protein H2B and fluorescent reporter proteins such as GFP. The H2B-EGFP complex is incorporated into chromatin without any adverse effects on cellular viability; expression of the complex by transgenic mice also has no effect upon their lifespan or fertility. This developmental neutrality enables the use of the complex in the visualization of nuclear dynamics during cell division. Localization of the complex in the nucleus also enables visual tracking of the movement of individual cells over time.

Applications: • The technology can be used to visualize and monitor cellular mechanisms such as division, movement, and death both in vivo and in vitro. • Selective visualization of chromatin can be used to focus on specific activities such as mitosis or meiosis.

Advantages: • Unlike other visualization methods that can only be used on dead specimens, the technology can be used to visualize active chromatin in live cells. • The technology exhibits improved signal-to-noise ratios in comparison to reporters containing nuclear localization sequences (nls) that tend to get dispersed throughout a cell during division. • In contrast to previous methods that employ transient expression of the GFP gene, the H2B-EGFP complex is resilient to fixation and retains its fluorescent properties for extended periods of time.

Patent Status: Copyright/Material

Licensing Status: Available for Sponsored Research Support


Express Licensing: https://www.flintbox.com/public/project/7596/”
Inventors

Virginia E. Papaioannou, Ph.D.