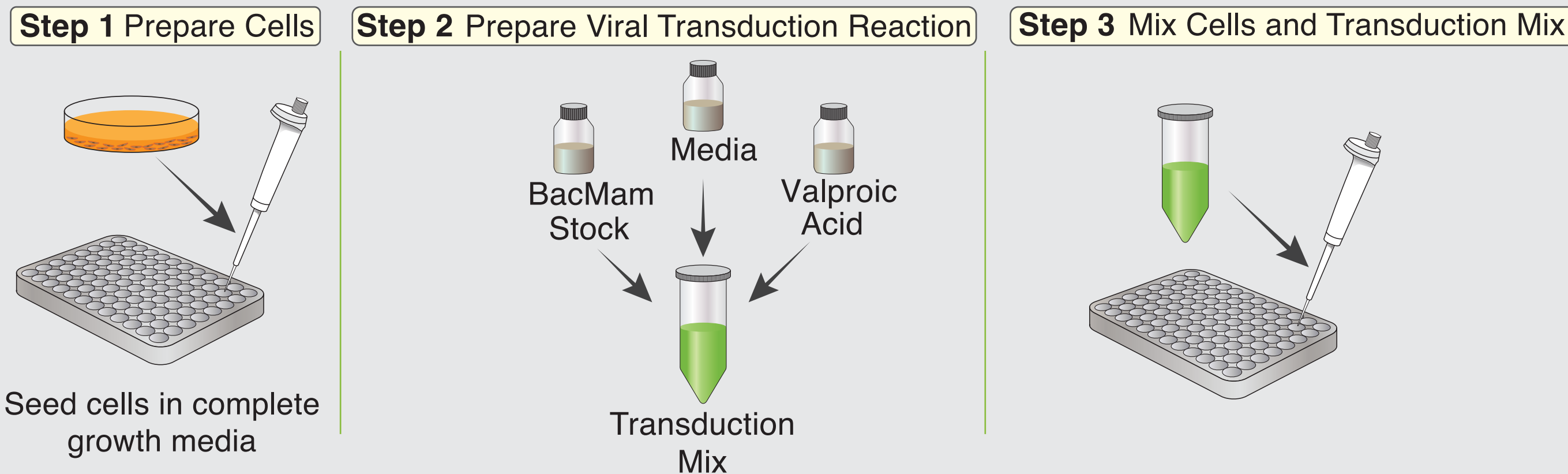




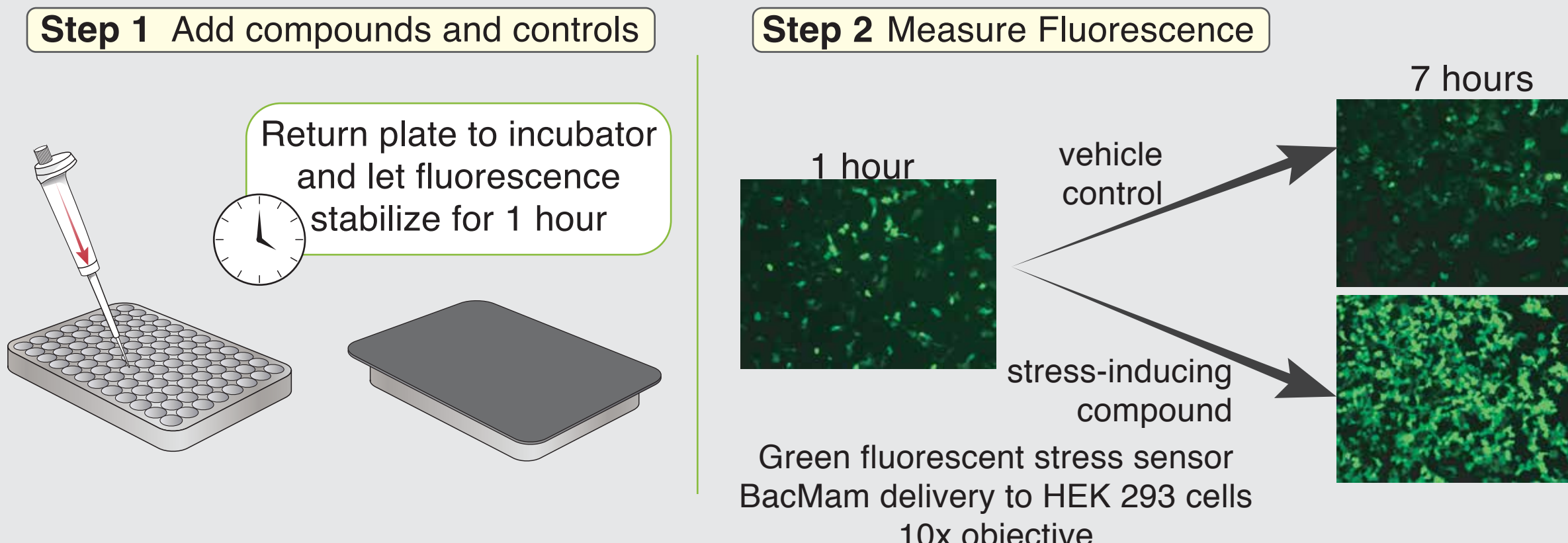
## Live cell detection of cellular stress

A simple protocol to detect cell stress and toxicity

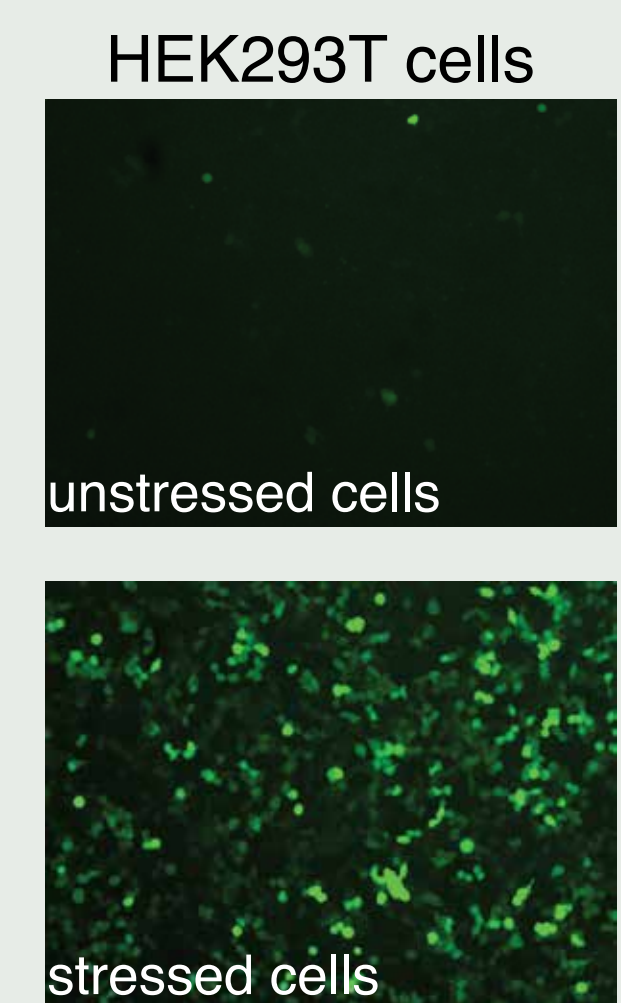
### Day 1: Transduce and Plate Cells



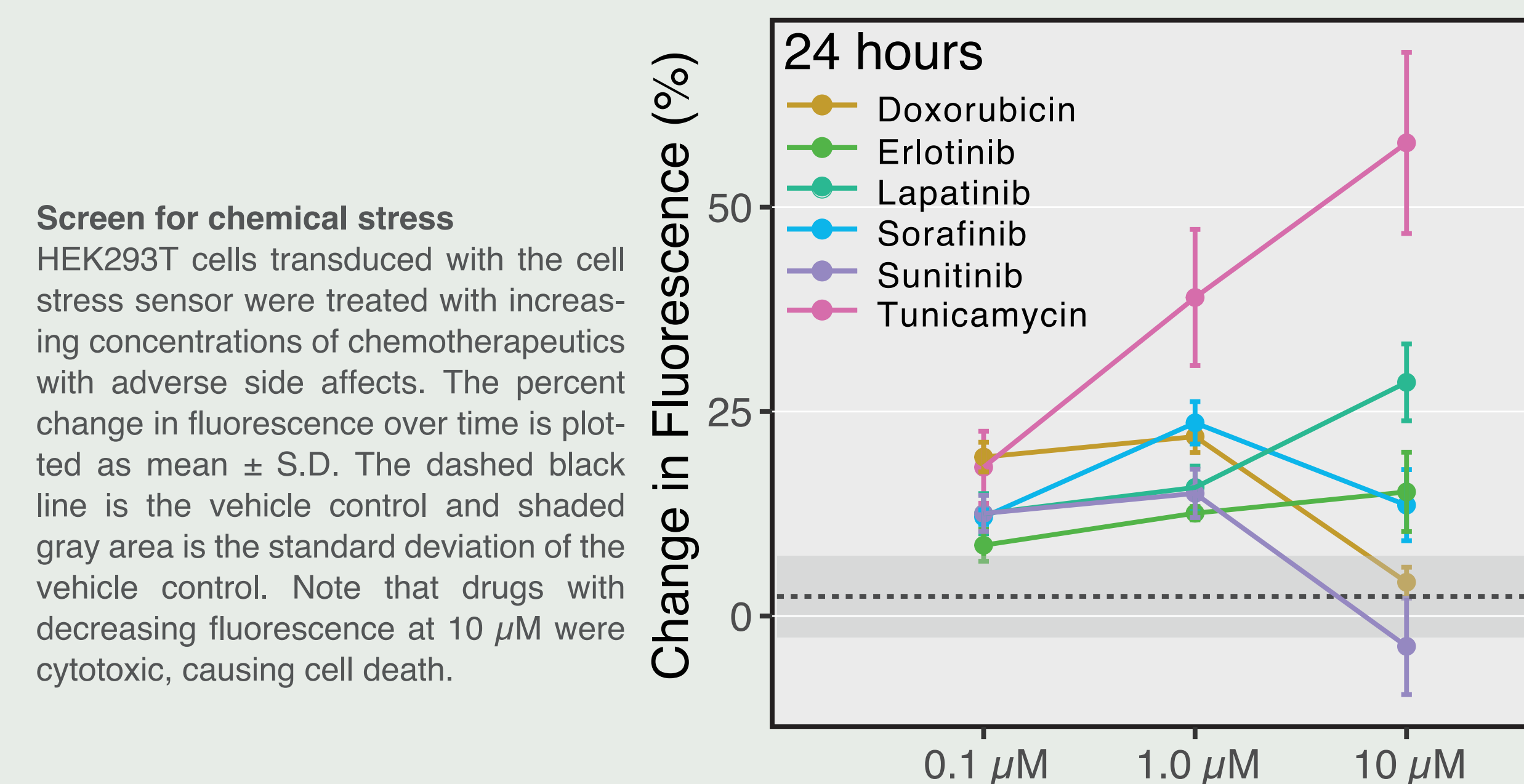
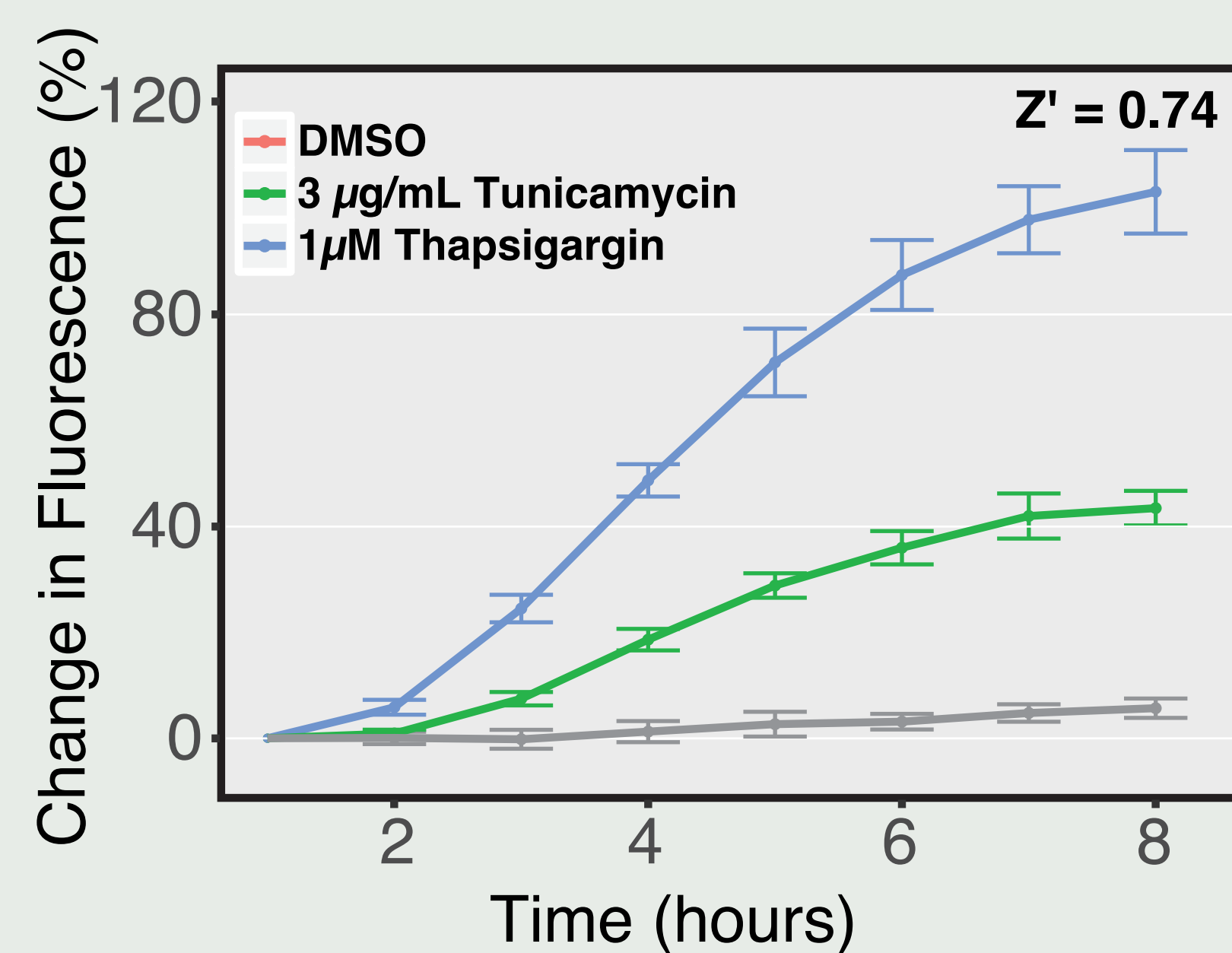
### Day 2: Live Cell Assay



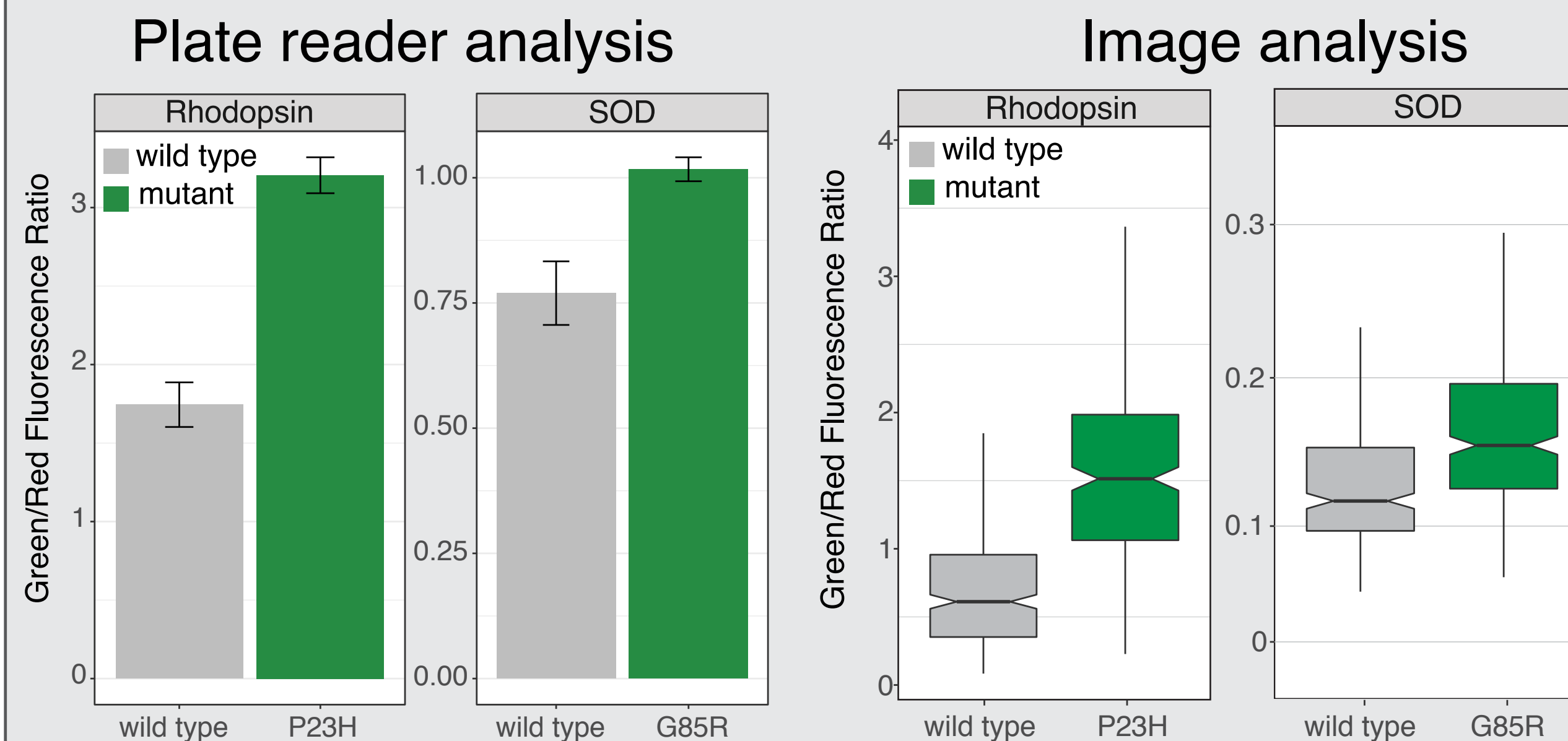
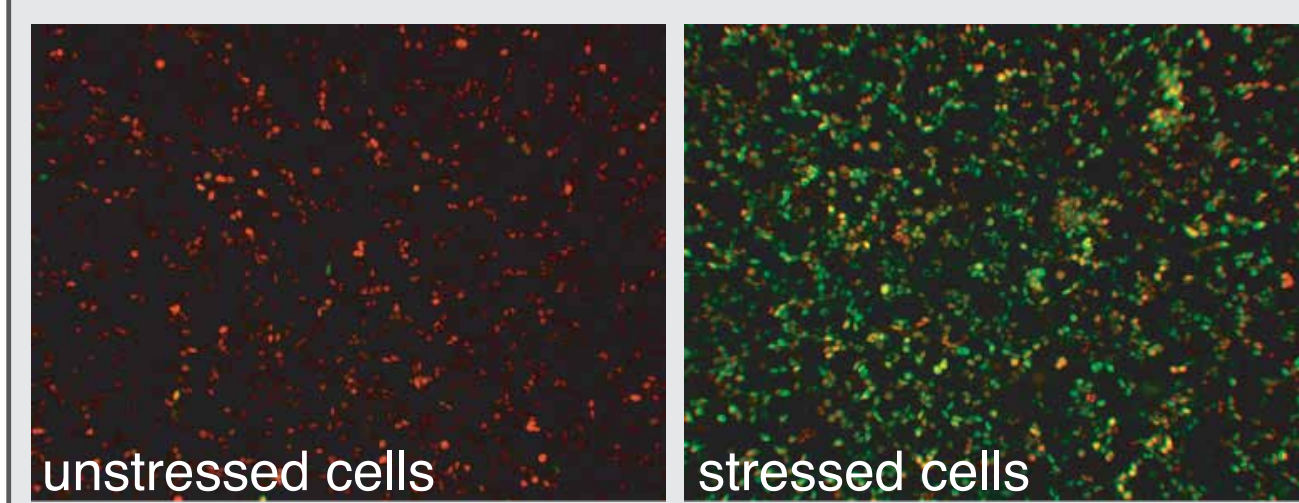
### Single-color detection of cell stress on fluorescent plate readers



The cell stress sensor is a genetically-encoded fluorescent biosensor that produces very bright fluorescence when the cell endures endoplasmic reticulum (ER) stress or undergoes the unfolded protein response (UPR). A broad host of both chemical compounds and genetic mutations can induce ER stress. The UPR is one of the major stress pathways within the cell, which allows the stress sensor to detect a wide range of stress inducing stimuli, some whose primary target is not the ER.

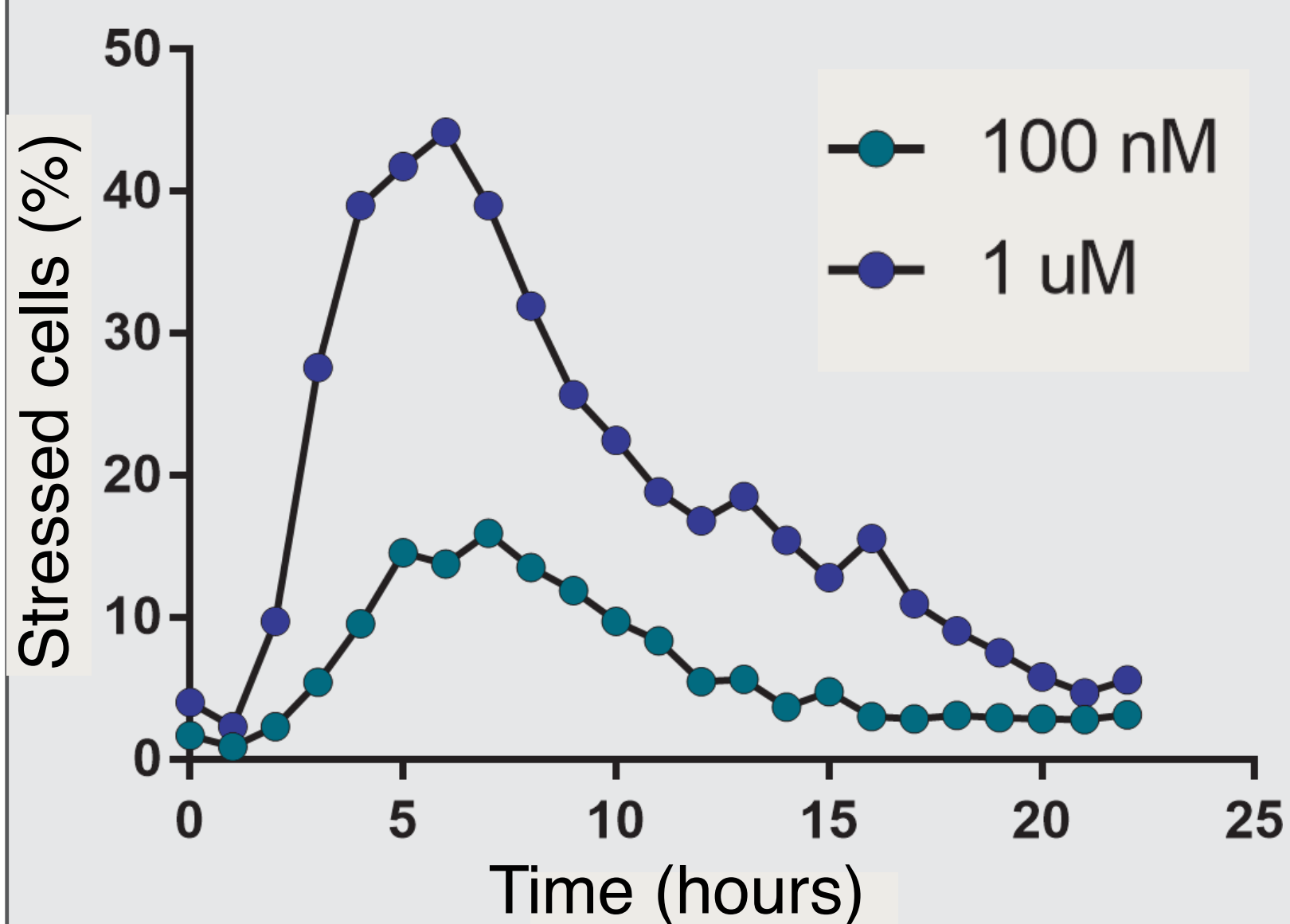
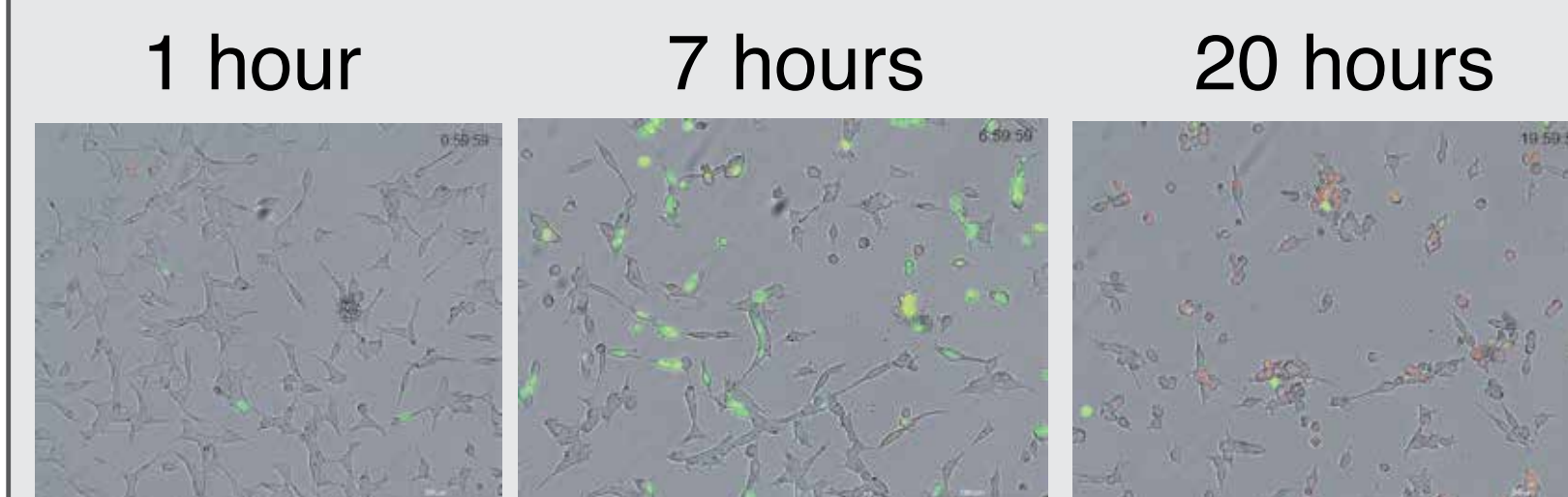


### Two-color stress sensor for high content or plate reader analysis



**Two-color stress sensors for plate reader and image based analysis**  
The two-color stress sensor contains a constitutively expressed nuclear localized red fluorescent protein and a stress induced nuclear localized green protein. This allows ratiometric detection of cell stress and easy cell segmentation and analysis for high content data. The data above compare cell stress induced by wild type and mutant versions of either the rhodopsin or SOD proteins. The bar plot compares data gathered on a plate reader (n=3 wells). The box plot compares imaging data (n=287 - 359 cells depending on condition).

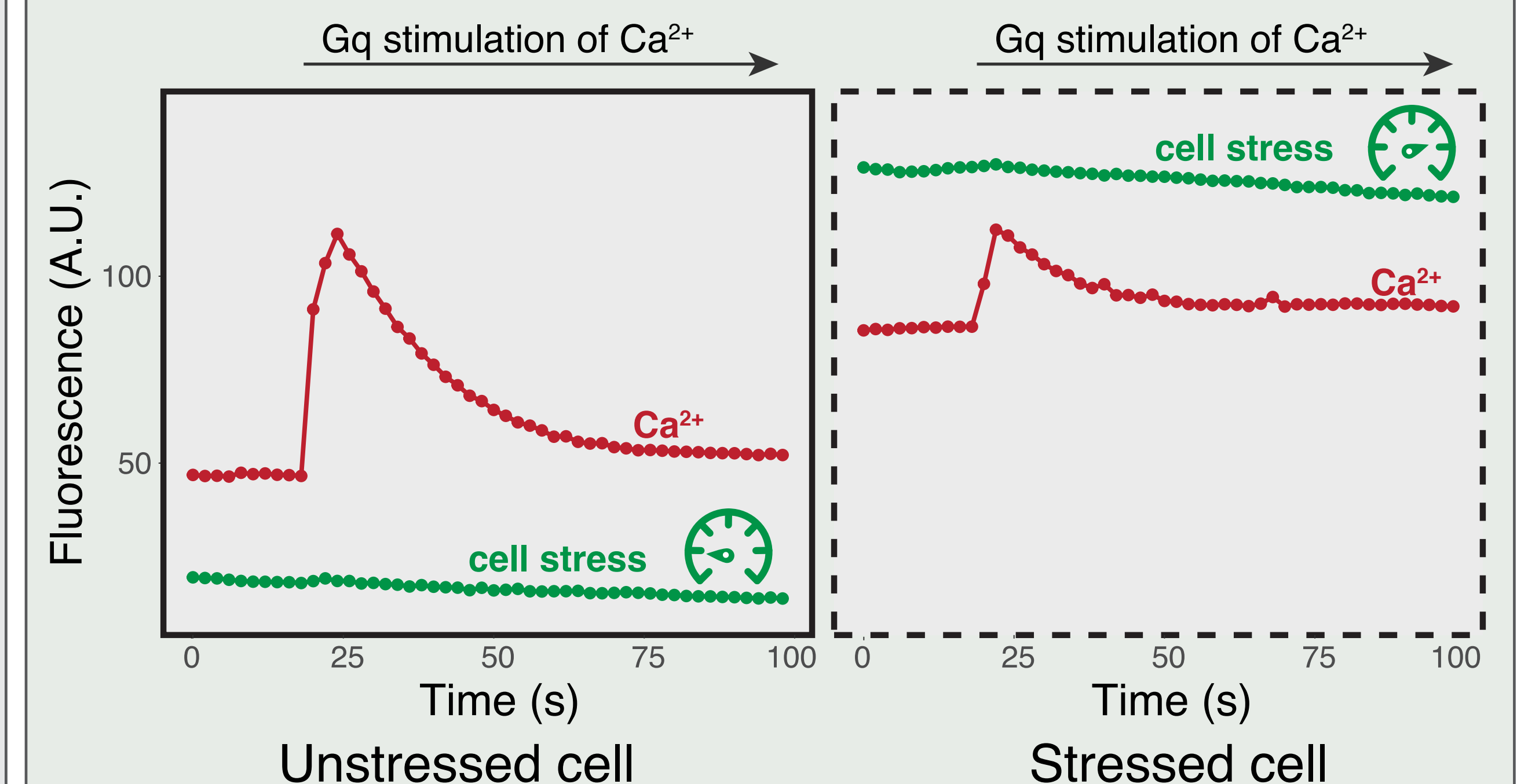
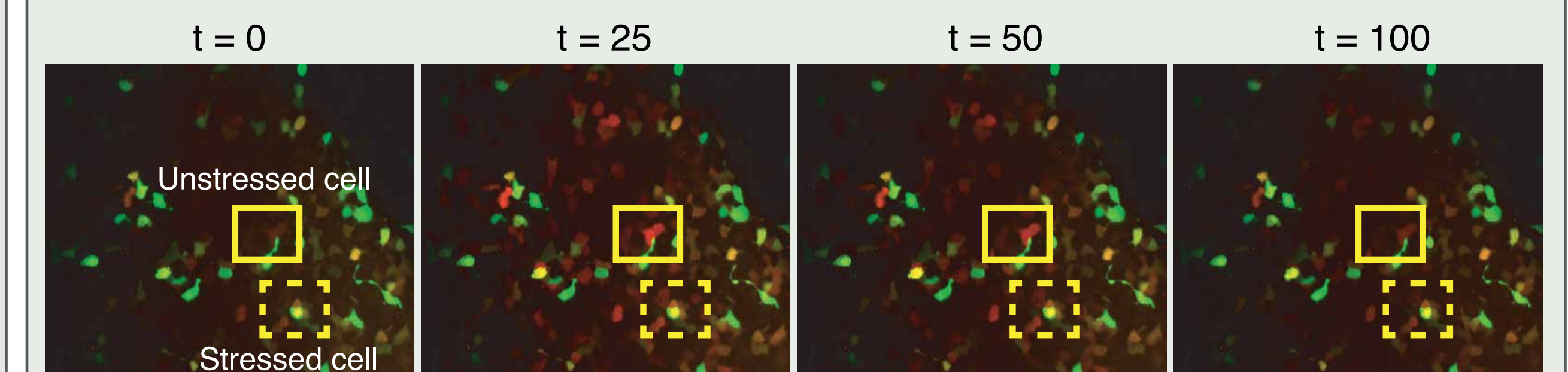
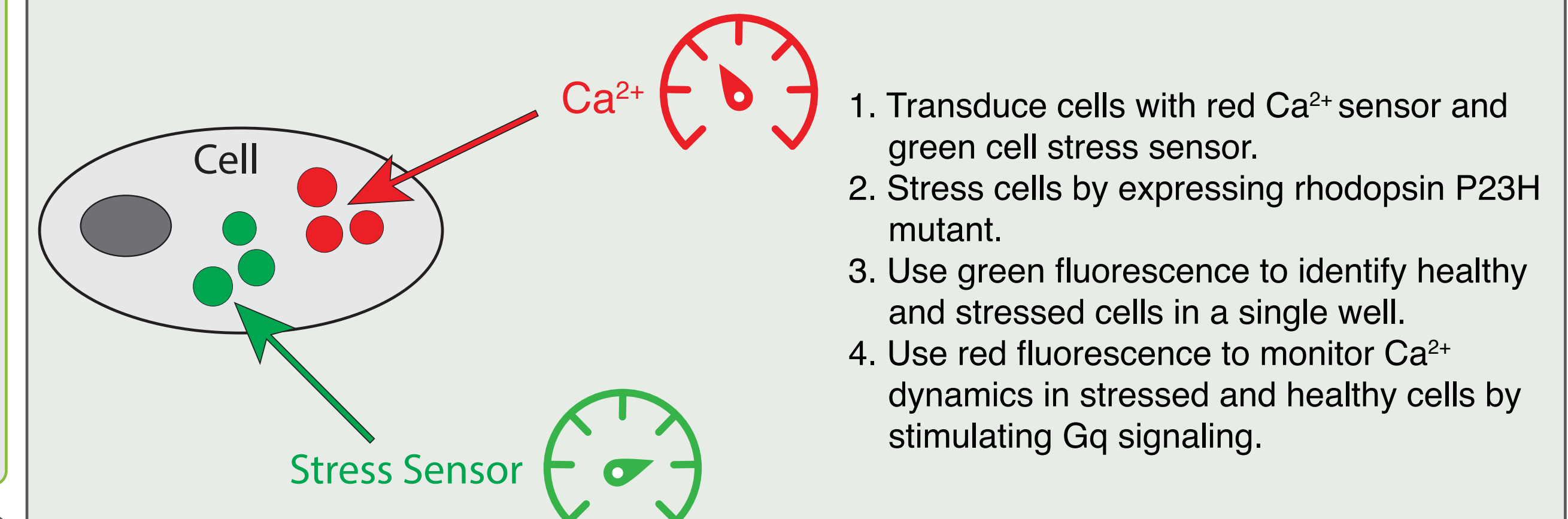
### A reversible detector of cell stress



## Extending applications of the cell stress sensor

Stress alters cellular signaling pathways

Multiplexing sensors to monitor  $Ca^{2+}$  signaling in stressed and healthy cells



### Using cell stress to detect cardiotoxicity

