



# A Real time *In Vitro* Phospho-BRET Sensor based Platform

TECHNOLOGY AVAILABLE FOR TRANSFER

## UNMET NEED AND OPPORTUNITY

Protein phosphorylation is a major and integral event in almost all cell signaling pathways and leads to activation of transcription factors and thereby regulation of cell activities. In majority of cancers, STAT3 is a key oncogenic molecule whose activation and signaling is absolutely necessary for cancer cells to survive, grow and migrate to distant organs. Also hyper-activation of AKT is a prominent signature in many human cancers which leads to phosphorylation of plethora of proteins that promote tumor cell survival and apoptosis resistance. Thus sensitive measurement of phosphorylation is pivotal in delineating protein activation. Therefore there is need for dynamic assay for monitoring AKT and STAT3 Phosphorylation. Such assays will be indispensable for screening effect of new therapeutic molecules limiting activation of AKT and STAT3 oncogenic signatures across several types of cancers.

## TECHNOLOGY

A vector construct based optical Phospho-STAT3 and Phospho-AKT BRET live cell sensor. Based on the biophysical principle of resonance energy transfer (RET), Bioluminescence RET or BRET based intracellular sensing tools have been developed which affirm protein homo- or heterodimer formation in live cell condition. Inherently, this technology is specific to the earliest change that triggers the disease conditions i.e. phosphorylation of STAT3 or AKT and thus allow screening of anti-cancer compounds against them. Compatible for screening in 96 to 384 plate format.

## INTELLECTUAL PROPERTY

Patent application filed in 2019.

### References

1. <https://www.alliedmarketresearch.com/oncology-cancer-drugs-market>
2. <https://www.marketwatch.com/press-release/global-cell-signaling-market-2019-analysis-by-key-development-factors-latest-trends-market-size-share-outlook-and-forecast-2025-2019-09-24>
3. <https://www.prnewswire.com/in/news-releases/cell-signaling-market-size-global-industry-to-grow-at-a-cagr-of-68-during-the-period-2018-2025-689340921.html>
4. <https://www.gminsights.com/industry-analysis/cancer-diagnostics-market>

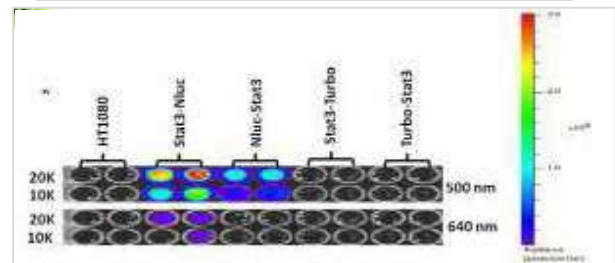
## APPLICATIONS

- High-throughput Screening Assay platform for
- Screening STAT3 and AKT protein phosphorylation modulator, activators, inhibitors, medicinal plant extracts
  - Pre-Clinical Investigations in Drug Testing, Gene Therapy, and Immuno-oncology
  - Studying molecular mechanism regulating the STAT3 and AKT pathway in oncology and various other disease

## STAGE OF DEVELOPMENT

- Proof of Principle demonstrated at lab scale
- Validated against at least two potential STAT3 activators (IL6 and EGF), and several inhibitors (Curcumin, Niclosamide and Static etc.)
- AKT platform validated in two cell lines (A2780, MCF7) using three different ligands (Insulin, IGF-1 and EGF) and inhibitors (Wortmannin, Picropodophyllin and Nicotinamide)

Luminescence image captured for the well plate with live cells expressing reporter constructs



## ADVANTAGES

Dynamic real time assessment in live cells without disturbing the physiological milieu

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