



Kinase assay to aid in development of therapeutics for acute myeloid leukemia

Peptide substrates to sensitively and specifically measure the real-time activity of FLT3, a kinase linked to acute myeloid leukemia.

IP Status: Issued US Patent; Patent No. 10,590,168

Applications

- Clinical diagnostic to determine AML behavior and optimal treatment strategy
- Oncology research on mechanism of resistance development in cancers (specifically AML)
- Chemotherapeutic drug identification and development
- Basic kinase research

Key Benefits & Differentiators

- **Highly selective and specific:** Perform 200% better compared to the currently available FLT3 substrate, capable of providing real-time activity measurements in live cells.
- **Multiple readouts amenable to high throughput assays:** Phosphorylation of the substrate can be measured using ELISA, mass spectrometry, or through incorporation of terbium binding segments eliciting a fluorescent readout.
- **Use with wild-type, unmodified kinases:** Does not require the modification or tagging of kinases prior to experimentation.

FLT3's heavy role in AML

Fms-like tyrosine kinase 3 (FLT3) kinase is one of the most frequently mutated genes in acute myeloid leukemia (AML). Early studies have shown that mutations in FLT3 are correlated with poor long-term prognosis with increased risk for relapse. To assess FLT3 activity, Laurie Parker's lab at the University of Minnesota designed substrates phosphorylated by FLT3 in a manner that is highly efficient and specific. Coupled with fluorescent and/or mass spectrometric readouts, these peptides are valuable tools in both drug discovery and diagnostics for FLT3-linked AML.

Measuring FLT3 activity to develop diagnostics and discover therapeutics

The developed FLT3 artificial substrates (FAS-A) is compatible with living cells and facilitates rapid detection of kinase activity in real time. When compared to alternatives, FAS-A is phosphorylated 200% more effectively than the only other FLT3 substrate reported in the literature (FLT3tide). Due to its high selectivity, FAS-A can be used in complex lysates or mixtures and with negligible off-target effects and can be multiplexed with other assays. Finally, the phosphorylation of the substrate can be measured using ELISA, mass spectrometry, or through incorporation of terbium binding segments, facilitating a fluorescent readout. This flexibility facilitates the use of the substrate in a wide variety of applications including high-throughput and drug discovery methods.

Phase of Development

Technology ID

20160394

Category

Life Sciences/Biomarkers
Life Sciences/Diagnostics & Imaging
Life Sciences/Human Health
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools
Gap Funding/Life Sciences
Gap Funding/Medical Tech

Learn more



Multiple designed substrates of wildtype and mutant forms of FLT3 assessed in vitro.

Researchers

Laurie Parker, PhD

Associate Professor, Biochemistry, Molecular Biology and Biophysics

[External Link](https://cbs.umn.edu) (cbs.umn.edu)

Publications

[*High-throughput Identification of FLT3 Wild-type and Mutant Kinase Substrate Preferences and Application to Design of Sensitive In Vitro Kinase Assay Substrates*](#)

Molecular and Cellular Proteomics, 2019

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