

**QTL**  
**BIOSYSTEMS**



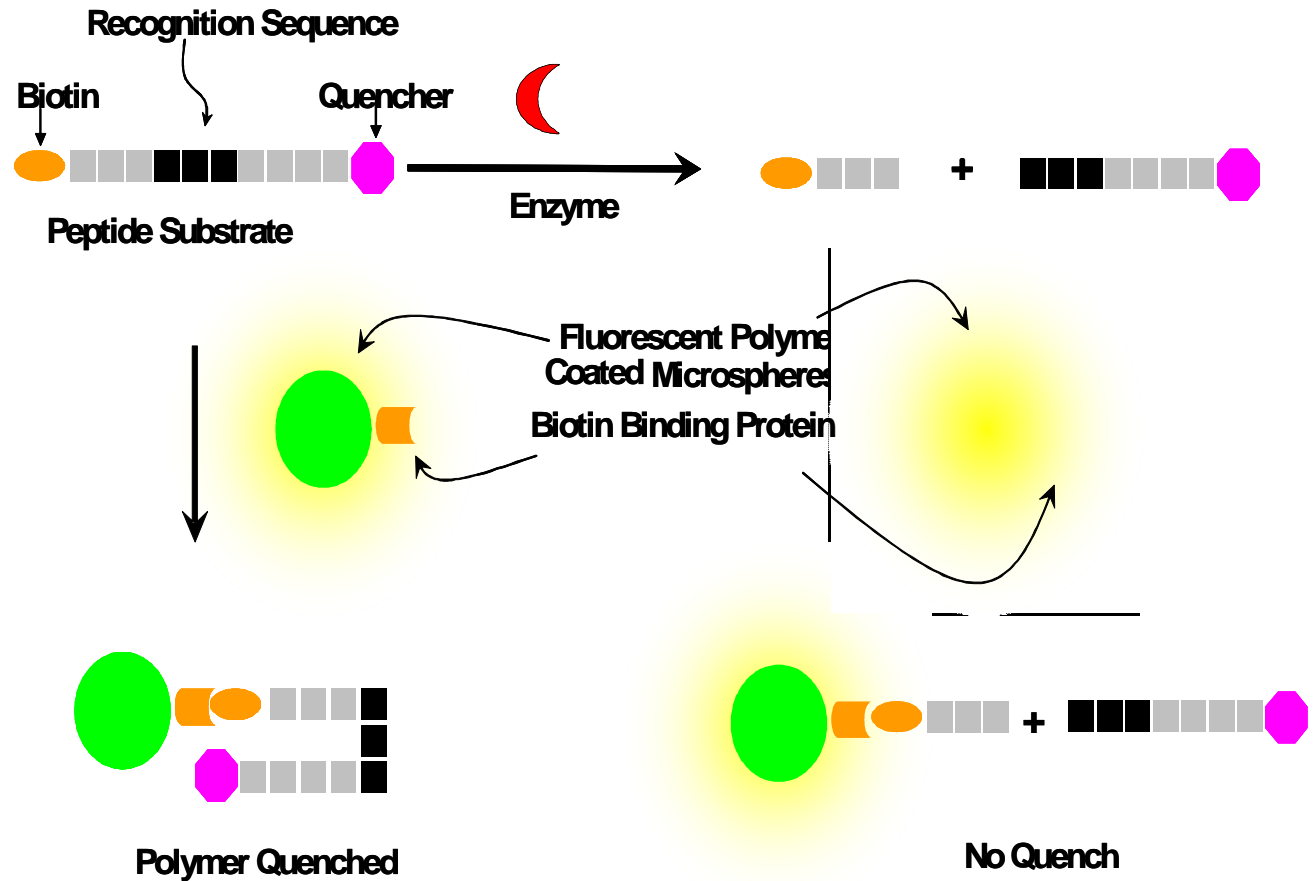
# QTL BIOSYSTEMS

- Founded 1999 in Santa Fe, New Mexico
- Proprietary technology from Los Alamos National Laboratory
- Technology was developed to detect specific bio-molecular events or interactions in biochemical compound screening assays
- Two business unit focuses
  - Drug Discovery and HTS assays
  - Biodefense and biotoxin detection
- Company has a staff of 26, with 14 Ph.D's

***Technology:***

- Detection system consists of a fluorescent polymer and quencher-tether-ligand (QTL) moieties
- The QTL moieties consist of a quencher that quenches polymer fluorescence, a ligand that is specifically cleaved by target enzyme, and a tether that connects the quencher and ligand
- When the reactive tether is cleaved by enzyme, the quencher is released from the polymer, resulting in a quantitative signal that increases with enzyme activity or duration of the assay
- Inhibitors of the enzyme modulate this signal increase, which can be tuned over a variety of sensitivity ranges as desired by target sensitivity requirements

- *Technology:*



# QTL BIOSYSTEMS

- *Technology has led to the development and release of HTS and Drug Discovery target specific assays:*



The diagram shows a central circular cell with a nucleus, surrounded by a ring of red, beaded structures. This is set against a glowing orange background within a rounded square frame.

**QTL LIGHTSPEED**

- INCREASED SPEED
- INCREASED SENSITIVITY
- DETECT BIOMOLECULES, PROTEINS, NUCLEIC ACIDS & WHOLE ORGANISMS



- *First commercially available assay:*

### **QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY**

- Applied to Alzheimer's disease research
- Major constituent of senile plaques associated with Alzheimer's is the  $\beta$ -amyloid peptide, generated by the activity of the enzyme  $\beta$ -secretase in the human brain
- Combines speed with sensitivity for screening potential inhibitors against  $\beta$ -secretase



## QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY

- *Format is single-step, instantaneous, and homogenous*
- *Fluorescence based assays*
- *Assay can be read with most commercially available fluorescence spectrometers or multi-well plate readers*
- *The excitation (**blue**) and detection (**green**) wavelengths are compatible with all common fluorimeters*



## QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY

- *Typical assay workflow:*
  - Dispense target enzyme, substrate & compounds to wells
  - Add sensor (fluorescent polymer)
  - Read fluorescence



## QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY

- *Advantages of technology:*
  - ***Sensitivity*** - fluorescent polymers offer advantages over conventional small molecule-based fluorescence assays
  - Polymers “harvest” light effectively both by absorption and by super-quenching – even sub-nanomolar solutions of some of these material are visibly colored
  - Fluorescence can be detected at even lower concentrations
  - Polymers can be synthesized in repeat ranges of 3 to 1000
  - Polymers provide 5 to 6 times the fluorescence signal of traditional FRET-based readouts

## QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY

- *Advantages of technology:*
  - *Simplicity and Throughput* - The assay format does not require...
    - Beads or washing steps
    - Radioactive compounds
    - Antibodies
    - Additional processing steps after all components have been added
    - Time to results from 10 minutes onwards depending on enzyme usage



## QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY

- *Applications:*
  - High-Throughput Screening for Alzheimer's drugs
  - Research in Alzheimer's Disease





**QTL**  
**BIOSYSTEMS**

**AMPLIFICATION TECHNOLOGY  
FOR BIOASSAYS**

**Protease Inhibitor Assays**



- *Assay Performance at 20% substrate conversion:*

- *S/B .....1.70*

- *S/N .....16*

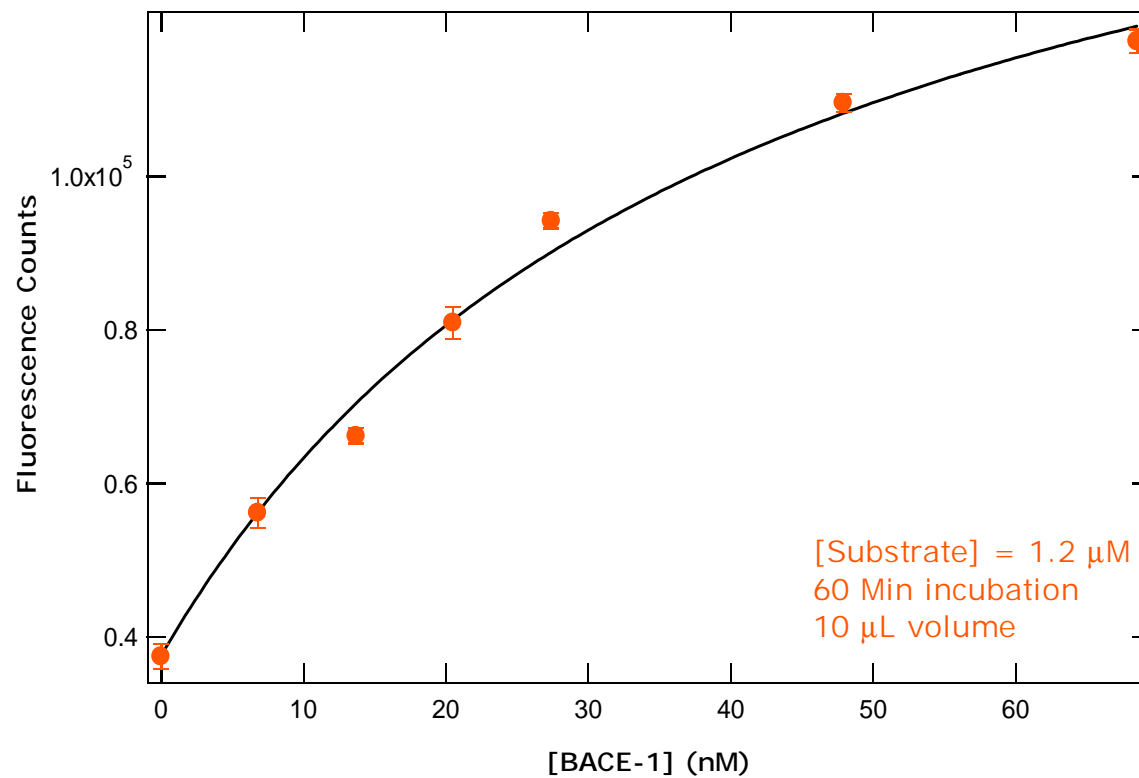
- *CV % .....1.80*

- *Z' .....0.74*

- *No. of repeats ...4*

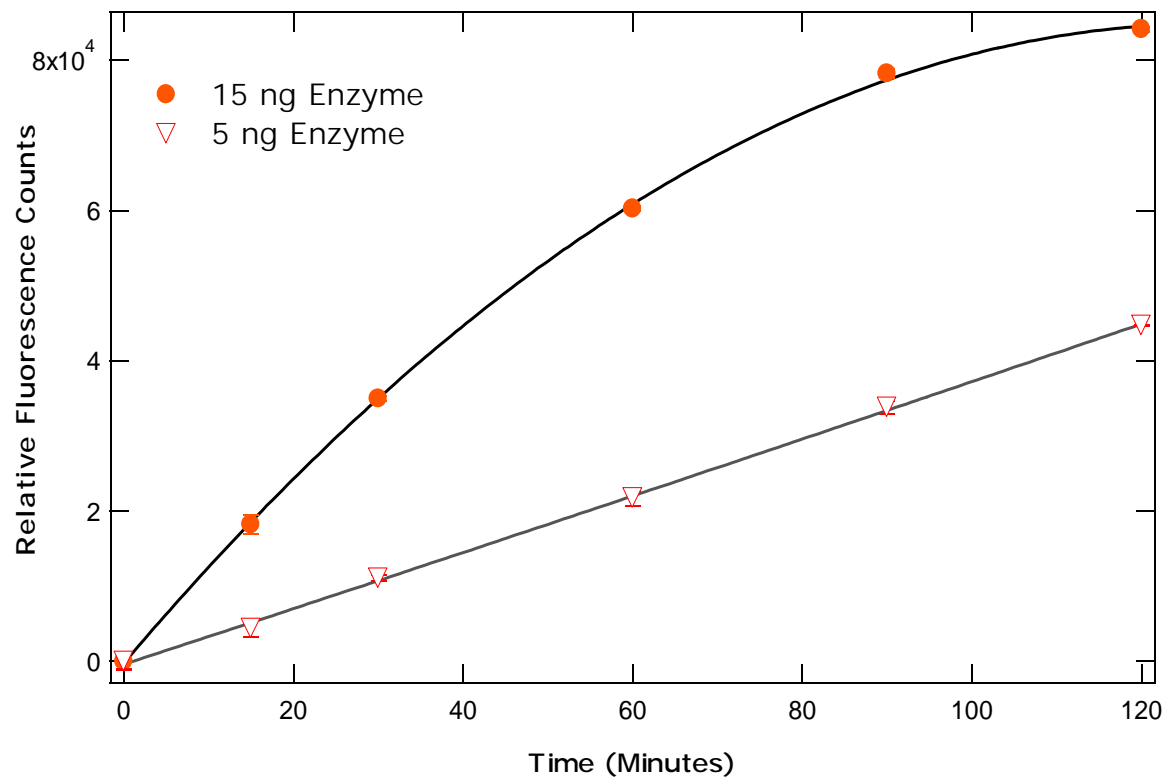
# QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY

## Enzyme concentration curve



# QTL LIGHTSPEED™ $\beta$ -SECRETASE ASSAY

## Time Response





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***Other areas of interest:***

- Additional HTS Assays:
  - Caspase 3,7
  - Kinase Assays: Detection Platform
- Assay Development Services
  - Custom Enzyme and Protein-Protein Assays
- Environmental Bio-detection
  - QTL Biosensor™ for bacterial spores and protein toxins



- Contact information:
- Sales and Business Development

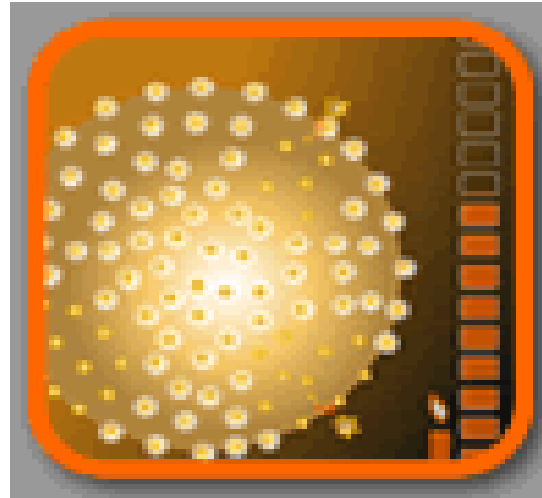
Paul Gindlesperger

Director of Sales and Marketing

505-424-1000, ext. 116

[pgindlesperger@qtlbio.com](mailto:pgindlesperger@qtlbio.com)

[www.qtlbio.com](http://www.qtlbio.com)



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