

## **How to Succeed in Science**

### **How to Develop a Clinical Product**

#### **Monitoring and Tracking Disease Events in Small Animals using Non-invasive Optical Imaging**

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Learning Objectives:

- Understand the fundamentals of non-invasive Optical Imaging
- Learn which optical reporters are most appropriate for preclinical imaging
- See example of how this technique has been used effectively in drug discovery and for monitoring complex biological processes in vivo

Since its inception in 1995, in vivo optical imaging has become a well-recognized technique for allowing disease states and complex biological processes to be non-invasively monitored in small animals. Genes encoding optical reporters, luciferases and fluorescent proteins, are engineered into cells (e.g., cancer cell lines and infectious disease agents) and animals (transgenic mice and rats) to enable them to produce light that can be visualized in vivo using highly sensitive CCD optical imaging equipment. This technique is equally amenable to imaging fluorescent dyes and particles, allowing fluorescently tagged biological entities (e.g., antibodies and peptides) to be monitored independently or in combination with genetically tagged events. An overview of this technology will be presented along with data demonstrating how in vivo optical imaging has been used by researchers worldwide to monitor a plethora of different preclinical diseases, from simple gastrointestinal infections to advanced metastatic cancers.

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