

Simon Fraser University/ Industry Liaison Office

Intellectual Property Case Studies

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Overview

- Research, Industry and IP
- IP Protection
- Definition
- The Patent Road Map
- Case Studies
 - SemBioSys Genetics Inc.
 - Quinolones

Life Sciences Research & The Industry

- Changes in
 - Technology
 - Academic research
 - Industry
- ↓
- Biotechnology companies, larger pharmaceutical companies
- Innovation and **IP** have become a fundamental business assets to fuel economic growth in the new economy

IP Protection

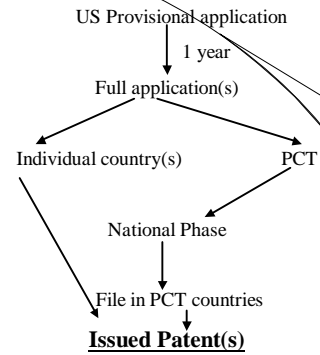
- Copyright
- Trademark
- Patents**
- Industrial Designs
- Trade secrets

What is a Patent?

“A form of monopoly for a limited period of time”

“A type of a social contract between the inventor and the Government”

The Road Map



Case Studies

1. SemBioSys Genetics Inc. (SGI)
2. The Quinolone Story

SemBioSys

- ⌘ A Canadian biotechnology company, founded in 1994 as a spinout from the University of Calgary.
- ⌘ Production, purification & sale of high-value recombinant proteins from plants
- ⌘ Plant genetic engineering techniques

SGI Continued

- Partners include:
 - Syngenta, Metabolic Pharmaceuticals & a multinational fine chemical manufacturer.
- Their strong IP portfolio ensures worldwide exclusivity to commercialize the Stratosome™ Biologics System.

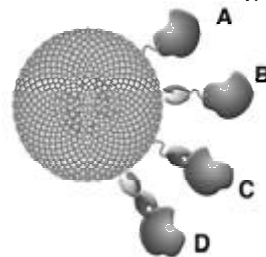
SGI Strategy

“SGI is focused on becoming a world leader in the application of biotechnology to solve production, formulation and delivery issues facing the pharmaceutical and personal care industries.”

Case Study, SemBioSys

The Technology and 1st Patent Application

SGI Technology



United States Patent 5,650,554 Moloney July 22, 1997
Oil-body proteins as carriers of high-value peptides in plants

- ⚡ Inventors: **Moloney; Maurice** (Calgary, CA)
- ⚡ Assignee: **SemBioSys Genetics Inc.** (Calgary, CA)

⚡ **Filed: December 30, 1994**

⚡ **Issued: July 22, 1997**

⚡

This application is a continuation-in-part of application Ser. No. 08/142,418, filed Nov. 16, 1993, now abandoned, which is a continuation-in-part of application Ser. No. 07/659,835, filed Feb. 22, 1991, now abandoned.

The Abstract

The present invention relates to the use of a class of genes called oil body protein genes that have unique features. The discovery of these features allowed the invention of methods for the production of recombinant proteins wherein a protein of interest can be easily separated from other host cell components. The invention is further exemplified by methods for exploitation of the unique characteristics of the oil body proteins and oil body genes for expression of polypeptides of interest in many organisms, particularly plant seeds. Said polypeptides may include but are not limited to: seed storage proteins, enzymes, bioactive peptides, antibodies and the like. The invention can also be modified to recover recombinant polypeptides fused to oleosins from non-plant host cells. Additionally the invention provides a method of using recombinant proteins associated with seed oil bodies released during seed germination for expression of polypeptides that afford protection to seedlings from pathogens. Finally, the persistent association of oil body proteins with the oil body can be further utilized to develop a biological means to create novel immobilized enzymes useful for bioconversion of substrates.

- ⚡ The use of oil body protein genes
- ⚡ Methods of expression & production of r.proteins
- ⚡ Method for separation of protein of interest
- ⚡ Expression of polypeptides in many organisms, particularly plant seeds
- ⚡ Polypeptides may include but are not limited to: seed storage proteins, enzymes, bioactive peptides, antibodies and the like.
- ⚡ The invention can also be used to recover r. polypeptides from non-plant host cells (bacterial host cell)
- ⚡ Using r. proteins associated with seed oil bodies released during seed germination for expression of polypeptides that afford protection to seedlings from pathogens.
- ⚡ Finally, develop biological means to create novel immobilized enzymes useful for bioconversion of substrates.

Issued Patents

- ⚡ US6,509,453 - "Oil bodies and associated proteins as affinity matrices"
- ⚡ U.S.6,372,234 - "Products for Topical Applications Comprising oilbodies"
- ⚡ U.S.6,288,304 - "Expression of somatotropin in plant seeds"
- ⚡ U.S.6,210,742 - "Uses of oilbodies"
- ⚡ U.S.6,183,762 - "Oilbody-based personal care products"
- ⚡ U.S.6,146,645 - "Uses of oilbodies"
- ⚡ U.S.5,948,682 - "Preparation of heterologous proteins on oilbodies"
- ⚡ U.S.5,856,452 - "Oilbodies and associated proteins as affinity matrices"
- ⚡ U.S.5,792,922 - "Oilbody protein cis-elements as regulatory signals"
- ⚡ U.S.5,650,554 - "Oilbody proteins as carriers of high-value peptides in plants."

Patents Pending

- ⌘ WO 02/50289 - "Methods for the production of multimeric proteins, and related compositions"
- ⌘ WO 01/95934 - "The use of plant oilbodies in vaccine delivery systems"
- ⌘ WO 01/16340 - "Flax seed specific promoters"
- ⌘ WO 01/14571 - "Commercial production of chymosin in plants"
- ⌘ WO 98/49326 - "Method for cleavage of fusion proteins"

Quinolones

- ⌘ Effective broad spectrum oral antibacterial agents
- ⌘ DNA gyrase inhibitors
- ⌘ The history begins in 1960s with the accidental discovery of Nalidixic Acid
- ⌘ We now have 5 different generations of quinolones

Commercially Available Quinolones Include

- | | |
|-----------------|-----------------|
| ⌘ Norfloxacin | ⌘ Fleroxacin |
| ⌘ Ciprofloxacin | ⌘ Levofloxacin |
| ⌘ Ofloxacin | ⌘ Trovafloxacin |
| ⌘ Moxifloxacin, | ⌘ Moxifloxacin |
| ⌘ Lomefloxacin | ⌘ |
| ⌘ Tosufloxacin | |

Major Companies involved

- | | |
|---------------------------|-----------------------------|
| ⌘ Bayer | ⌘ Hoechst Marion Roussel |
| ⌘ Warner-Lambert | ⌘ Abbott |
| ⌘ Pfizer | ⌘ Tanabe |
| ⌘ Glaxo Wellcome | ⌘ Takeda |
| ⌘ Aventis | ⌘ Otsuka Pharmaceutical Co. |
| ⌘ Merck & Company | ⌘ Bristol Myers Squibb |
| ⌘ Daiichi Pharmaceuticals | ⌘ LG Chemicals Ltd |
| ⌘ Hoffmann-La Roche | ⌘ SmithKline Beecham |
| ⌘ Johnson & Johnson | ⌘ Kyorin |
| ⌘ Rhone-Poulenc Rover | ⌘ Taiho Pharmaceuticals |