

# CARDIOGENICS MAGNETIC BEADS

## FACT SHEET

### Summary

CardioGenics' silver-coated paramagnetic beads (the "CardioGenics Beads") represent a significant product advance over current similar commercial products. All commercial magnetic beads are made of dark iron oxide. CardioGenics has developed a proprietary process to plate magnetic beads with a layer of silver, making them white, and more sensitive to light. In testing against all commercially available beads, the CardioGenics Beads demonstrated a seven-fold improvement in light harvesting, which results in improved testing sensitivity.

### Market Background

► **Due to simplicity in use and ease of manipulation, magnetic particles are the preferred solid phase for immobilizing biological material used in test kits developed for:**

- Clinical laboratory testing analyzers (immunoassays/DNA binding)
- Life sciences research market
- Cell & nucleic acid separation
- Protein purification
- Sample enrichment

#### ► **Market of Magnetic Beads**

- Global *In Vitro Diagnostic* (IVD) market estimated at \$22.9 billion in 2002
- Expected growth of the IVD is 7% per year
- Immunoassay testing segment of this market is 40%
- About 90% of the immunoassay analyzers employ both magnetic particles and light measurements
- Estimated magnetic beads market is about \$1 billion for immunoassay only (3<sup>rd</sup> party market report)

#### ► **Magnetic Beads Producers**

- Several companies commercialize magnetic particles for biomedical research and *in-vitro diagnostic* applications
- All commercial products contain dark iron oxide material
- Current commercial manufacturing processes is by encapsulation of magnetic pigment inserted in a latex particle
- Three (3) main players, led by Merck Chimie, several small ones
- Prices range from \$900-1500/gram of solids

### ► The CardioGenics Beads

- A 24 month developmental process supported by grants from National Research Council of Canada (NRC), 4 in total
- Proprietary silver-plating process, adapted to various sizes (1-50 micron) beads
- CardioGenics Beads plated with silver for color conversion (Black to White)
- CardioGenics Beads are then polymer encapsulated
- CardioGenics developed its own polymer encapsulation process
- CardioGenics also produced beads to be encapsulated by its partner through their proprietary polymer encapsulation process
- CardioGenics encapsulated beads are manufactured by a simplified process
- Beads encapsulated by CardioGenics will be processed in batch sizes of “commercial lots”



### Competitive Advantages

#### ► Current commercial beads suffer from the following shortcomings:

- All commercial magnetic particles are dark
- About 80% of generated light, is lost which results in low testing sensitivity
- The manufacturing process is complicated and expensive

#### ► The CardioGenics Beads offer the following advantages:

- Maximize light collection by white color conversion
- High magnetic moment, easy manipulation
- Chemically-robust surface chemistry
- Simplified manufacturing process-- less costly

- *Compared with beads of all major suppliers, the CardioGenics Beads show consistent ~7 fold improved light signal to address needs of IVD industry for more sensitive tests (published data).*

### **Market Advantage**

#### **▶ Applications that would benefit from:**

- Increased test sensitivity by at least ~5 fold, early diagnosis
- Easy sample manipulation
- Custom-made linking chemistry

### **Potential End Users**

#### **▶ *Clinical In-Vitro Diagnostics* test developers**

- Ten (10) first tier global IVD test manufacturers
- Thirty (30) second tier IVD test manufacturers
- Numerous small regional manufactures

#### **▶ Life sciences research applications, companies/universities**

### **Future Markets**

- Proteins/ DNA Binding
- Cell sorting
- Nanoreactors
- Adaptation to POC/other instruments (non-competitive)

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