FUNCTIONAL GENOMICS

Athersys Therapeutics
and
IDEC Pharmaceuticals

Functional Genomics

- Application of genomic data and algorithms
- Build drugs better, faster, cheaper
- “Post-genome” era opportunities is drawing in investors, entrepreneurs, and large pharmaceuticals
- Genome map will be useless unless Functional Genomics takes off
Post Genome Era

- Will be concerned with finding relationships between genes, proteins, drugs, and disease.
- Gene specific research will be replaced by genome wide and protein specific research.
- Key terms: Proteomics, Bioinformatics

Pharmaceuticals

- $350 Billion pharmaceutical industry is investing heavily in Functional Genomics
- Rosetta, Illumina both managed $1 Billion market valuations at IPO

<table>
<thead>
<tr>
<th>Pre-Genome</th>
<th>Post Genome</th>
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<tbody>
<tr>
<td>FDA 90% failure rate</td>
<td>FDA 50 – 70%</td>
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<tr>
<td>High costs for failed</td>
<td>Up to three weeks to determine</td>
</tr>
<tr>
<td>research</td>
<td>whether a drug technology will</td>
</tr>
<tr>
<td></td>
<td>work</td>
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Investor gains

- Company can go from ZERO to Millions in sales almost overnight.
- Real Products that have high margins and good pricing power, and growth spans years.
- Potential 400 drug targets has grown to 10,000.
- Billions of gene in Human Genome
- Expected to be at the head of the IPO market

Not Pets.Com

Unlike most Dot.Coms, biotech firms have:
- Real Product
- Realizable Earnings
- Business Model that works
- Business Cycle
Not An Overnight Phenomenon

- FDA requires up to 10 years of research and $600 Million for approval of new genomic drugs.
- Patent Litigation
- Ethical Standards

Déjà Vu?

**Biotech Developers**
Product will make or break a developer.
Needs better Proteomic technology to reduce cost

**Large Pharmaceuticals**
Can easily afford million dollar drug development
Minimizes risk by buying large portfolio of pipeline drugs
How to Approach Biotech

- This is only Phase I
- Support companies that spur growth and development in the Industry
- Public Investing is replacing academic funding
- Setting Market Standards
- Watch for innovated technology and alliances

Athersys (ATHX)

- Biggest thing since Celera
- In the IPO pipeline
- Sell novel drugs to big pharmaceuticals

- Will replace recombinant DNA technology
- Proprietary Technology: RAGE
Athersys: RAGE

- Random Activation of Gene Expression
- Allows Athersys to “activate” a gene and its protein function
- Determines the function of genes of which nothing is known
- Revolutionize Gene sampling and researching

Athersys: Alliancing

- This small company is doing what government and university funded labs cannot
- Acorda: Nervous System
- Elan: AIDS
- Medarex: Prostate Cancer

Takes Athersys 1 month to cross sample possible therapeutic genes against tumor sample and identify genes that support or hinder the cancer

Medarex can develop antibody in less then 12 months
IDEC Pharmaceuticals

- Strong fundamentals, excellent growth
- Markets Rituxan treatment for non-Hodgkin’s Lymphoma (NHL) with Genentech
- NHL is increasing by 6%, and Rituxan sales by 30%
- Next Product: Zevalin
- In the pipeline: rheumatoid arthritis, multiple sclerosis, psoriasis, and asthma treatments.
Key Numbers

Price & Volume
Recent Price $55.00
52 Week High $77.65
52 Week Low $18.54
Avg Daily Vol (Mil) 2.42
Beta 1.41

Valuation Ratios
Price/Earnings 154.06
Price/Sales 56.63
Price/Book 11.19
PEGrowth 4.9

Per Share Data
Earnings $0.36
Sales $0.97
Book Value $4.92

Mgmt Effectiveness
Return on Equity 19.75
Return on Assets 12.90
Return on Investment 13.49

Profitability
Gross Margin 98.62
Operating Margin 36.11
Profit Margin 37.11

Industry Comparison

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<thead>
<tr>
<th>ISPH</th>
<th>AMGN</th>
<th>GALT</th>
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</thead>
<tbody>
<tr>
<td>Name</td>
<td>IDEC Pharmaceuticals Corporation</td>
<td>Amgen Inc.</td>
</tr>
<tr>
<td>Industry</td>
<td>Biotechnology</td>
<td>Biotechnology</td>
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<tr>
<td>Where share price is estimated to gain the most?</td>
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<td></td>
<td></td>
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<tr>
<td>Current</td>
<td>$64.00</td>
<td>$70.44</td>
<td>$54.25</td>
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<tr>
<td>FY End</td>
<td>$57.60</td>
<td>$52.04</td>
<td>NA</td>
</tr>
<tr>
<td>% Change</td>
<td>62.22%</td>
<td>16.47%</td>
<td>NA</td>
</tr>
<tr>
<td>Next Fiscal Yr</td>
<td>$130.41</td>
<td>$109.39</td>
<td>NA</td>
</tr>
<tr>
<td>% Change</td>
<td>158.35%</td>
<td>41.10%</td>
<td>NA</td>
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<td>Who sold and earned the most over past 12 months?</td>
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<td></td>
<td></td>
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<tr>
<td>Total Sales</td>
<td>$155 Mil</td>
<td>$3,229 Mil</td>
<td>$1,736 Mil</td>
</tr>
<tr>
<td>Total Income</td>
<td>$48 Mil</td>
<td>$1,133 Mil</td>
<td>$480 Mil</td>
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<td>What growth rates and income the most over the past 12 months?</td>
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<tr>
<td>Sales Growth</td>
<td>31.42%</td>
<td>12.33%</td>
<td>22.10%</td>
</tr>
<tr>
<td>Income Growth</td>
<td>11.18%</td>
<td>3.90%</td>
<td>NA</td>
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<td>Whose shares are priced cheapest relative to earnings?</td>
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<td></td>
<td></td>
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<tr>
<td>Price/Earnings Ratio</td>
<td>176.20</td>
<td>66.70</td>
<td>NA</td>
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<td>Whose current health is strongest?</td>
<td></td>
<td></td>
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<tr>
<td>Net Profit Margin</td>
<td>31.00%</td>
<td>31.40%</td>
<td>-3.90%</td>
</tr>
<tr>
<td>Debt/Equity Ratio</td>
<td>0.56</td>
<td>0.05</td>
<td>0.03</td>
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Source: MSN.Com
Final Notes

• Winners:
  Companies that make use of functional genomics and provide innovative approaches and analytical tools, to improve our understanding between genes, proteins, drugs, and diseases.

• Losers:
  Companies who fail to make the transition into the post genomic era, and remain competitive using current proteomic technology.