



## Biotechnologies used by your firm

2. Please review the following list of biotechnologies, and check the applicable circle for each technology.

Biotechnologies	Currently Used in Operations?	IF "YES" ▶ Principal Use (check one only)			IF "NO" Do you PLAN TO USE within 3 years?
		Products/ Processes Development	Clinical/ Field Trials	Current Production	
<b>DNA Based</b>					
Genetic Engineering	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Gene Probes	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Bio-informatics / Genomics / Pharmacogenetics	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
DNA Sequencing / Synthesis / Amplification	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Gene Therapy	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
<b>Biochemistry / Immunochemistry Based</b>					
Vaccines / Immune Stimulants / Drug Design & Delivery / Combinatorial Chemistry	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Diagnostic Tests / Antibodies	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Peptide / Protein Sequencing or Synthesis	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Cell Receptors / Cell Signalling / Pheromones / Three Dimensional Molecular Modelling / Structural Biology	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Biosensors	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Biomaterials	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Microbiology / Virology / Microbial Ecology	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
<b>Bioprocessing Based</b>					
Cell / Tissue / Embryo Culture & Manipulation	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Fermentation / Bioprocessing / Biotransformation / Biobleaching / Biopulping / Biobleaching / Biodesulphurization	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Extraction / Purification / Separation	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Bioremediation / Phytoremediation / Biofiltration / Bioindicators	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
Natural Products Chemistry	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
<b>Others (Please specify)</b>					
	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No
	1 <input type="radio"/> Yes 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	1 <input type="radio"/> Yes 2 <input type="radio"/> No

If your company does not presently use or plan to use any of the biotechnologies listed above, please stop here. Sign and return questionnaire. Thank you for your cooperation.

**BIO-INDUSTRY SECTOR**

3. a) Please indicate the top 3 bio-industry sectors, where applicable, in numbered order, that best describe your firm's biotechnology activities, (use 1 for the Most important and 3 for the least important). Please also indicate the number of products based on genetic engineering (rDNA) your company has in each of the relevant development stages:

**Human Health - Bio**

- 1) **Diagnostics** (e.g. immunodiagnostics, gene probes, biosensors)
- 2) **Therapeutics** (e.g. vaccines, immune stimulants, biopharmaceuticals, rational drug design, drug delivery, combinatorial chemistry)
- 3) **Gene Therapy** (e.g. gene identification, gene constructs, gene delivery)

**Bio-Informatics**

- 4) **Genomics and Molecular Modelling** (e.g. DNA/RNA/protein sequencing & databases for humans, plants, animals and microorganisms)

**Ag - Bio**

- 5) **Plant Biotechnology** (e.g. tissue culture, embryogenesis, genetic markers, genetic engineering)
- 6) **Animal Biotechnology** (e.g. diagnostics, therapeutics, embryo transplantation, genetic markers, genetic engineering)
- 7) **Biofertilizers/Biopesticides/Bioherbicides/Biological Feed Additives/Microbial pest control** (e.g. bacteria, fungi, yeasts)
- 8) **Non-Food Applications of Agricultural Products** (e.g. fuels, lubricants, commodity and fine chemical feedstocks, cosmetics)

**Food Processing**

- 9) **Bioprocessing** (e.g. using enzymes and bacteria culture)
- 10) **Functional Foods/Nutraceuticals** (e.g. probiotics, unsaturated fatty acids)

**Aquaculture**

- 11) **Fish health** (e.g. diagnostics, therapeutics)
- 12) **Broodstock genetics** (e.g. tracking superior traits, genetic modification / engineering)
- 13) **Bioextraction** (e.g. karageenan from seaweed, antifreeze proteins from fish, flavours)

**Mining/Energy/Petroleum/Chemicals**

- 14) **Microbiologically enhanced petroleum/mineral recovery**
- 15) **(Cleaner) Industrial Bioprocessing** (e.g. biodesulphurization, bio-cracking, bio-recovery)

**Forest Products**

- 16) **Silviculture** (e.g. ectomycorrhizae, tissue culture, somatic embryogenesis, genetic markers, genetic engineering)
- 17) **(Cleaner) Industrial Bioprocessing** (e.g. biopulping, biobleaching, biological prevention of sapstain)

**Environment**

- 18) **Biofiltration** (e.g. treatment of organic emissions to air/water)
- 19) **Bioremediation and Phytoremediation** (e.g. cleanup of toxic waste sites using microorganisms)
- 20) **Diagnostics** (e.g. detection of toxic substances using bioindicators, biosensors, immunodiagnostics)

**Other**

- 21) **Custom synthesis- chemical or biological** (e.g. peptides, proteins, nucleotides, hormones, growth factors, biochemicals)
- 22) **Other** (please specify)

Top Bio-sectors (1 to 3 by importance) Please write number and sub-headings from above list	Number of products by development stages		
	Approved/ On Market (number)	Clinical/Field Trial stage (number)	Under development (number)
1			
2			
3			

b) Did you implement a new or significantly improved **PROCESS** in the last 3 years that required the development of biotechnologies?

1 Yes ➤ How many?

2 No

c) Do you **PLAN** to implement in the NEXT 3 years a new or significantly improved **PROCESS** that requires the development of biotechnologies?

1 Yes ➤ How many?

2 No

## Financial Information

### 4. Total Business Activity (All activities including Biotech)

- a) Is your firm a public company? <sup>1</sup>  Yes  
<sup>2</sup>  No

- b) Please report data for 1997 or the latest fiscal year available.  
 Do not include sales and operations of your **subsidiaries** located outside Canada.

Fiscal year  
 (if different from 1997)

Balance Sheet	1997	Revenue	1997	Expenses	1997
Cash & securities	000\$	Product sales	000\$	R&D	000\$
Total Assets	000\$	Contract Research	000\$	All other expenses	000\$
Total liabilities	000\$	Other revenue	000\$		
Shareholders Equity	000\$				

<b>TOTAL Exports</b> (as % of product sales)	%	Total exports to the United States (as % of product sales)	%
Biotechnology Related Exports (as % of product sales)	%	Total exports to Europe (as % of product sales)	%
		Total exports to Asia (as % of product sales)	%
		Total exports to South/Latin America (as % of product sales)	%
		Total exports to other countries (as % of product sales)	%

Total number of employees  
 (average for the year):

What percentage of your product sales  
 are based on biotechnology?  % OR bio product sales  000\$

What percentage of your R&D expenses  
 are based on biotechnology?  % OR bio R&D  000\$

## R&D

5. a) Did your firm have biotech R&D expenditures  
 in any of the years 1995-1997? <sup>1</sup>  Yes  
<sup>2</sup>  No

- b) In the past 5 years, did your company apply  
 for the tax benefit under the R&D (SR&ED)  
 tax programme?

<sup>1</sup>  Yes ➤ What was the most recent year?

<sup>2</sup>  No ➤ Why did your company not apply?  
 (check most important only)

<sup>1</sup>  complexity of the application process

<sup>2</sup>  uncertainty of eligibility

<sup>3</sup>  did not meet eligibility requirements

<sup>4</sup>  other (specify)

## Strategic Partnerships

6. Does your firm currently have any strategic alliances with other organizations (*a strategic alliance is a formal agreement with another firm to do business activities without merging*)

Strategic Alliance for:		Canadian Partner	Foreign Partner, (Please identify country of partner)				
			USA	E-U	Asia	South/ Latin America	Other
Marketing/Distribution	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Manufacturing	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Regulatory Affairs	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Finance	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Other	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
<b>R&amp;D Partnership:</b>							
Biotech Company	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Other company	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
University	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Hospital	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Research Institute	1 <input type="radio"/> Yes ➤ 2 <input type="radio"/> No	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>
Federal Lab (Canadian)	1 <input type="radio"/> Yes 2 <input type="radio"/> No						
Provincial Lab (Canadian)	1 <input type="radio"/> Yes 2 <input type="radio"/> No						
Network of Centres of Excellence (Canadian)	1 <input type="radio"/> Yes 2 <input type="radio"/> No						

## Human Resources engaged in Biotechnology Activities

7. a) In your current biotechnology activities, please give the number of employees on staff in the listed positions (include contract personnel and use fractions of a person-year if individuals are filling more than one role).

Position	Number Now Employed	Positions Unfilled Now	Estimated Number Employed in year 2001
R&D			
Clinical Affairs/Quality Assurance			
Regulatory/Legal/Government Affairs			
Manufacturing			
Marketing & Sales			
Business Development/Finance			
Administration/Human Resources			

**Human Resources engaged in Biotechnology Activities (continued)**

7. b) Does your firm have a formal employee development program (continuing education and training program)?

- 1  Yes ➤ If yes, estimate your firm's total expenditures on formal education and training in 1997?  \$000 OR  %  
2  No (\$000) or as a percentage of product sales \$ OR %

c) Does your firm employ co-op program students from universities?

- 1  Yes  
2  No

d) Do you have a full time person solely responsible for Human Resources in your organization?

- 1  Yes  
2  No

e) What is your approximate professional staff turnover rate (persons leaving as a % of total staff) for the biotechnology activity in 1997?

%

f) Are you experiencing problems in recruiting Business Operations staff?

- 1  Yes ➤ If YES. In which specialties? 1  Finance  
2  No 2  Marketing  
3  Regulatory, Legal  
4  Clinical Affairs

g) Are you experiencing problems in recruiting Technical / Production / Scientific / R&D staff?

- 1  Yes ➤ If YES. In which specialties? 1  Scientist  
2  No 2  Engineering  
3  Technicians

h) Have you tried to hire personnel from outside Canada in 1997?

- 1  Yes 2  No

▼  
If Yes, From which areas?

- 1  US  
2  EU  
3  Asia  
4  South/Latin America  
5  Other

▼  
If Yes, were you successful?

- 1  Yes  
2  No ➤ If No, Was the problem related to the following issues?  
1  Personal income taxes  
2  Immigration Rules  
3  Advancement opportunities  
4  Other

## Intellectual property (IP) instruments

8. a) Have you ever had to abandon an important biotech project because further work was blocked by IP rights held by another organization?

- 1  Yes ➤ Was this an issue of scope of patent in Canada as compared to other countries? 1  Yes  
 2  No 2  No

b) Has your firm been involved in litigation related to patent infringement in the past year?

- 1  Yes ➤ How many different cases?   
 2  No

c) During the last three years has your firm assigned the right to use intellectual property **TO**:  
*(check where applicable)*

	In Canada	Outside Canada
Another firm	1 <input type="radio"/>	2 <input type="radio"/>
Government lab	3 <input type="radio"/>	4 <input type="radio"/>
University	5 <input type="radio"/>	6 <input type="radio"/>
Hospital	7 <input type="radio"/>	8 <input type="radio"/>

d) During the last three years has your firm acquired the right to use intellectual property **FROM**:  
*(check where applicable)*

	In Canada	Outside Canada
Another firm	1 <input type="radio"/>	2 <input type="radio"/>
Government lab	3 <input type="radio"/>	4 <input type="radio"/>
University	5 <input type="radio"/>	6 <input type="radio"/>
Hospital	7 <input type="radio"/>	8 <input type="radio"/>

## Problems for Biotechnology Commercialization in Canada

9. Select **the three** issues that you consider are the most important problems to successfully commercialize your biotechnology products/processes:

- 01  Access to capital  
 02  Access to smart capital (money plus management expertise)  
 03  Access to technology  
 04  Skilled human resources  
 05  Consumer acceptance  
 06  Lack of information about markets
- Regulations:
- 07  Labeling  
 08  Limited international harmonization  
 09  IP protection  
 10  Cost for gaining regulatory approval  
 11  Time required to gain regulatory approval
- 12  Other (please specify)

## Financing

10. a) Did you raise capital in 1997 for biotechnology?

- 1  Yes ➤ How Much?  000\$
- 2  No

**For what purposes?**  
(check most important)

- 1  R&D
- 2  Regulatory approvals
- 3  Process Scaleup
- 4  Other

**Sources?**  
(check most important)

- 1  Friends / "Angel Investors"
- 2  Venture Capital / Labour Sponsored Funds
- 3  Private Placement
- 4  IPO (Initial Public Offering)
- 5  Secondary Public Offering
- 6  Strategic Alliance Partner
- 7  Other

b) Are you planning to raise capital in 1998?

- 1  Yes ➤ How Much?  000\$
- 2  No

**For what purposes?**  
(check most important)

- 1  R&D
- 2  Regulatory approvals
- 3  Process Scaleup
- 4  Other

**Sources?**  
(check most important)

- 1  Friends / "Angel Investors"
- 2  Venture Capital / Labour Sponsored Funds
- 3  Private Placement
- 4  IPO (Initial Public Offering)
- 5  Secondary Public Offering
- 6  Strategic Alliance Partner
- 7  Other

## Strategic Decisions

The following question should be answered by the CEO of your company.

11. As the CEO, what were the most important decisions you made over last year (1997)? For this year (1998)?  
(check up to three for each year)

	1997	1998		1997	1998
Refocused current product development	01 <input type="radio"/>	02 <input type="radio"/>	Licensed out technology	19 <input type="radio"/>	20 <input type="radio"/>
Downsized the organization	03 <input type="radio"/>	04 <input type="radio"/>	Alliances with academia	21 <input type="radio"/>	22 <input type="radio"/>
Increased the size of the organization	05 <input type="radio"/>	06 <input type="radio"/>	Alliances with government	23 <input type="radio"/>	24 <input type="radio"/>
Entered product trials	07 <input type="radio"/>	08 <input type="radio"/>	Alliances with companies	25 <input type="radio"/>	26 <input type="radio"/>
Launched new product	09 <input type="radio"/>	10 <input type="radio"/>	Raised private capital	27 <input type="radio"/>	28 <input type="radio"/>
Acquired a company	11 <input type="radio"/>	12 <input type="radio"/>	Raised public capital	29 <input type="radio"/>	30 <input type="radio"/>
Acquired by a company	13 <input type="radio"/>	14 <input type="radio"/>	Raised \$ from alliance	31 <input type="radio"/>	32 <input type="radio"/>
Outsourced to others	15 <input type="radio"/>	16 <input type="radio"/>	Raised \$ from sales	33 <input type="radio"/>	34 <input type="radio"/>
Licensed in technology	17 <input type="radio"/>	18 <input type="radio"/>	Borrowed \$	35 <input type="radio"/>	36 <input type="radio"/>
			Other (please specify)	37 <input type="radio"/>	38 <input type="radio"/>

## Comments

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**Thank you for your cooperation !**