



# Biotechnology Use and Development Survey - 2001

### Confidential when completed

Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, c. S-19. Completion of the questionnaire is a legal requirement under the Statistics Act.

Si vous préférez ce questionnaire en français, veuillez cocher



## Information for the Respondent

### Survey Purpose

Statistics Canada is undertaking this survey to produce a profile of firms engaged in biotechnology activities in Canada. The survey focuses on the characteristics and activities of firms that use or develop biotechnology as part of their company's activity.

Biotechnology is an emerging sector of the Canadian economy and its impact has the potential to be felt through all parts of Canada's society. An accurate understanding of biotechnology requires comprehensive data. Information from this survey may be used by businesses for economic or market analysis, by trade associations to study industry performance, government departments and agencies to assist policy formation, and by the academic community for research purposes. Statistics Canada may create a database by combining survey data with existing Statistics Canada data records.

Please report 2001 on Canadian biotechnology activities of your firm unless a specific question indicates otherwise. Complete a separate questionnaire for each company engaged in biotechnology activities in Canada.

### Confidentiality

Statistics Canada is prohibited from publishing any statistics that would divulge information obtained from this survey that relates to any identifiable business, institution or individual. Data is treated in strict confidence, used for statistical purposes and released in aggregate form only. The confidentiality provisions of the *Statistics Act* are not affected by either the Access to Information Act or any other Legislation.

### Federal-Provincial Agreement

In order to avoid duplication of enquiry, reduce the cost of collection and provide consistent statistics, Statistics Canada has entered into an agreement with the Institut de la Statistique du Québec. Under Section 11 of the Statistics Act data collected from Quebec firms in this survey will be transmitted to the Institut de la Statistique du Québec. The Statistics Act of Quebec includes the same provisions for confidentiality and penalties for disclosure of information as the Federal Statistics Act.

### Who Should Complete This Questionnaire?

A senior manager, scientist/researcher or production manager should complete this questionnaire.



### Assistance

If you have questions or require assistance please contact:

Claire Racine-Lebel  
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Ottawa K1A 0T6  
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### Please provide the following information:

Name of person completing this form	Telephone number Area code  _ _  -  _ _  -  _ _ _ _
Title	Fax number  _ _ _  -  _ _ _ _
Web address	E-mail

## Section 1 - Biotechnologies in Use

This section measures the use of biotechnologies in your firm.

1. Using the table below, please indicate the use your firm makes of each type of biotechnology listed. Check the applicable circle or circles.

Biotechnologies	Currently Used in Operation 0	If currently using, do you use them for			Number of Years in Use 4	If No ▼ Do you plan to use within 3 years? 5
		Product/Process Development 1	Current Production 2	Environmental Purposes 3		
<b>DNA - the coding</b>						
1000 Genomics/Pharmaco-genetics	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1010 Gene probes	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1020 DNA sequencing synthesis amplification, Genetic Engineering	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Proteins and Molecules - the functional blocks</b>						
1100 Protein/peptide sequencing/synthesis	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1110 Lipid/protein engineering	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1120 Proteomics	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1130 Hormones, growth factors, pheromones	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1140 Cell receptors signalling	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Cell and Tissue Culture, and Engineering</b>						
1200 Cell/ tissue culture, Embryo manipulation	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1210 Tissue engineering	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1220 Hybridization	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1230 Cellular fusion	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1240 Vaccine/immune stimulants	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Process Biotechnologies</b>						
1300 Bioreactors	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1310 Fermentation, Bioprocessing	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No

Biotechnologies	Currently Used in Operation 0	If currently using, do you use them for			Number of Years in Use 4	If No ▼ Do you plan to use within 3 years? 5
		Product/ Process Development 1	Current Production 2	Environmental Purposes 3		
1320 Biobleaching, Bio-pulping, Biobleaching, Biodesulphurization	<input type="radio"/> Yes → <input type="radio"/> No →	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1330 Bioremediation, Biofiltration	<input type="radio"/> Yes → <input type="radio"/> No →	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Sub-Cellular Organisms</b>						
1400 Gene Therapy	<input type="radio"/> Yes → <input type="radio"/> No →	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1410 Viral Vectors	<input type="radio"/> Yes → <input type="radio"/> No →	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Other</b>						
1500 Bioinformatics	<input type="radio"/> Yes → <input type="radio"/> No →	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1510 Nanobiotechnologies	<input type="radio"/> Yes → <input type="radio"/> No →	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1520 Other, Please Specify: _____	<input type="radio"/> Yes → <input type="radio"/> No →	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No

**If you use at least one of the biotechnologies listed in Question 1**



**Go to Section 2**

**If you do not use any of the biotechnologies listed in Question 1**



**Please return the questionnaire in the accompanying prepaid return envelope.**

**Thank you for your assistance.**

## Section 2 - The Effects of Biotechnology on Your Firm

This section measures the factors influencing the use of biotechnology in your firm and the impact of biotechnology use on your firm's performance.

2. Using the table below, please rate the level of influence of each factor on increasing your use of biotechnology.

		Importance				
		Low 1	2	3	4	High 5
		—————→				
<b>Inputs</b>						
2000	Access to capital	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010	Access to technology/information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2020	Access to human resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Markets</b>						
2100	Size of Domestic Market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2110	Access to international markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2120	Information about markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2130	Distribution & marketing channels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Constraints</b>						
2200	Public perception/acceptance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2210	Cost of regulatory approval	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2220	Time required for regulatory approval	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2230	Limited international harmonization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2240	Patent rights held by others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2250	Lack of protection for intellectual property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2260	Other, Please specify:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_____					
	_____					

3. For each of the performance factors listed below, please rate the level of impacts of biotechnology use on your firm's performance.

		Importance				
		Low 1	2	3	4	High 5
		—————→				
<b>Increased Productivity</b>						
3000	Labour costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3010	Capital costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3020	Energy costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Improved Products</b>						
3100	New products or processes introduced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3110	Product range increased	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3120	Product quality increased	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Knowledge Based</b>						
3200	Developing new areas for R&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3210	Increase efficiency for R&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Improved Market Performance</b>						
3300	Market position improved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3310	New Market Niche Developed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3320	Sales increased	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3330	Other, Please Specify:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_____					
	_____					

## Section 3 - Human Resources in Biotechnology

Concerns have been expressed about the availability of skilled biotechnology employees. Your cooperation in careful completion of this section is essential in developing an accurate understanding of human resources in biotechnology. For the purpose of this survey Employees are defined as those workers for whom you completed a Canada Customs and Revenue Agency T-4 statement for the 2001 tax year. Include working owners. Do not include students. Only count employees working in Canada. If '0' (zero) indicate '0'.

### Number of Biotechnology Employees

4. a) How many employees does your firm employ in Canada?  
Please Report Typical Employment Level for 2001.

b) How many employees have biotechnology-related responsibilities?  
Please Report Typical Employment Level for 2001.

#### c) Full-time Biotechnology Employees

For each group listed below indicate how many are full-time biotechnology employees (50% or more of their time spent on biotech related activities)? If an employee fulfils more than 1 duty, report their primary responsibility. Count each person only once. Please Report Typical Employment Level for 2001.

Position	Number of full-time
Scientific Research & Direction	4100
Technicians	4110
Regulatory/Clinical Affairs	4120
Production	4130
Finance/Marketing	4140
Management	4150
Other, Please Specify:	4160
<b>Total Full-time employees</b>	4170

#### Part-time Biotechnology Employees

d) For each group listed below indicate how many are Part-time biotechnology employees (less than 50% of their time spent on biotech related activities)? If an employee fulfils more than 1 duty, report their primary responsibility. Count each person only once. Please Report Typical Employment Level for 2001.

Position	Number of part-time
Scientific Research & Direction	4200
Technicians	4210
Regulatory/Clinical Affairs	4220
Production	4230
Finance/Marketing	4240
Management	4250
Other, Please Specify:	4260
<b>Total Part-time employees</b>	4270

#### e) Total Number of biotechnology employees.

Total full-time and part-time employees with biotechnology-related responsibility (Box 4170 + Box 4270)

*This number must equal 4010 above.*

**Recruiting Practices**

5. a) Does your firm have unfilled biotechnology-related positions?

5000  No ► Go to question 5b

Yes ► In the table below indicate the number of unfilled positions by category.

Position	Number of Unfilled Positions
Scientific Research & Direction	5100
Technicians	5110
Regulatory/Clinical Affairs	5120
Production	5130
Finance/Marketing	5140
Management	5150
Other, Please Specify:	5160
<b>Total unfilled positions</b>	<b>5170</b>

b) Did your firm attempt to recruit any biotechnology employees in 2001?

5200  No ► Go to question 8

Yes ► Were you successful?

5300  No ► Go to question 6

Yes ► How many did you hire?

5310
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c) What sources were successfully used in recruiting biotechnology staff?

5400  University Recruitment

5450  Other Biotechnology Firms

5410  Temporary/Contract Staff

5460  Pharmaceutical Firms

5420  Employment agencies/Headhunters

5470  Newspaper/Journal

5430  Professional Associations

5480  Student Internship

5440  Own Staff/Incentive program

5490  Internal Training of Staff

6. Please rate the impact of the following factors on your efforts in filling biotechnology-related vacancies.

Factors	Importance				
	Low 1	2	3	4	High 5
<b>Candidate Factors</b>					
6000 Compensation requirements by candidates too high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6010 Candidates unwilling to relocate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6020 Lack of experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Firm Factors</b>					
6100 Capital/resources insufficient to attract candidates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>External Factors</b>					
6200 Lack of qualified candidates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6210 Competition for qualified candidates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6220 Other, Please Specify	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Did you attempt to hire biotechnology staff from outside of Canada in 2001?

7000  No ► Go to question 8

Yes ► Was your firm successful in hiring from outside of Canada?

7010  No ► Go to question 8.

Yes ► How many staff from outside Canada did you hire?

7020

8. Did any biotechnology personnel leave your firm in 2001?

8000  No ► Go to question 9

Yes ► How many?

8010

#### Section 4 - Biotechnology Products

This section measures the development of new biotechnology products and processes by your firm.

9. a) Do you have biotechnology products/processes on the market?

9000  No ► Go to question 9b)

Yes ► What year was the most significant product first introduced?

9010

b) Is your firm currently developing products that require the use of biotechnology?

9100  No ► Go to question 9c)

Yes ► What year will the most significant of these products reach market?

9110

c) Is your firm currently developing processes that require the use of biotechnology?

9200  No ► Go to question 9d)

Yes ► What year will the most significant of these processes be completed?

9210

d) Do you consider biotechnology central to your firm's activities or strategies?

9300  No

Yes

e) If you answered "Yes" to any Part of Question 9

► Go to Q10

Otherwise

► Please return the questionnaire in the accompanying prepaid return envelope.

Thank you for your assistance.

10. In the table below, for each sector listed please indicate the number of biotechnology products or processes your firm currently has for each stage of development.

Biotechnology Sector	Number of biotechnology products/processes by development stage			
	Research & Development 0	Pre-clinical trials/ Confined field trials 1	Regulatory phase/ Unconfined release assessment 2	Approved/ On market/In production 3
<b>Human Health</b>				
10000 <b>Diagnostics</b> (e.g. biosensors, immunodiagnosics, gene probes)				
10010 <b>Therapeutics</b> (e.g. vaccines, immune stimulants, biopharmaceuticals)				
10020 <b>Drug Delivery</b>				
<b>Agriculture Biotechnology</b>				
10100 <b>Plant Biotechnology</b> (e.g. tissue culture, embryogenesis, genetic markers, genetic engineering)				
10110 <b>Animal Biotechnology</b> (e.g. diagnostics, therapeutics, embryo transplantation, genetic markers, genetic engineering)				
10120 <b>Non-food Agriculture</b> (e.g. fuels, lubricants, commodity and fine chemical feedstocks, cosmetics)				
<b>Natural Resources</b>				
10200 <b>Energy</b> (e.g. microbiologically enhanced petroleum recovery, industrial bioprocessing, biodesulphurization)				
10210 <b>Mining</b> (e.g. microbiologically enhanced mineral recovery, industrial bioprocessing, biodesulphurization)				
10220 <b>Forest Products</b> (e.g. biopulping, biobleaching, biopesticides, tree biotechnology, industrial bioprocessing)				
<b>Environment</b>				
10300 <b>Air</b> (e.g. bioremediation, diagnostics, phytoremediation, biofiltration)				
10310 <b>Water</b> (e.g. biofiltration, diagnostics, bioremediation, phytoremediation)				
10320 <b>Soil</b> (e.g. biofiltration, diagnostics, bioremediation, phytoremediation)				
<b>Aquaculture</b>				
10400 Fish health, broodstock genetics, bioextraction				
<b>Bioinformatics</b>				
10500 <b>Genomics &amp; molecular modelling</b> (e.g. DNA/RNA/protein synthesising & databases for humans, plants, animals, and micro-organisms)				
10510 <b>Gene therapy</b> (e.g. gene identification, gene constructs, gene delivery)				
<b>Food Processing</b>				
10600 <b>Bioprocessing</b> (e.g. using enzymes and bacteria culture)				
10610 <b>Functional Foods/Nutraceuticals</b> (e.g. probiotics, unsaturated fatty acids)				
10620 Other, Please Specify				



**11. a)** What is the total time required to bring your principal biotechnology product or process from the initial development phase/proof of concept stage to the market? If still in pre-market stages provide an estimate.

Years  Months

**b)** What is the total cost to bring your principal biotechnology product or process from the initial development phase/proof of concept stage to the market? If still in pre-market stages provide an estimate.

\$  ,000

**Section 5 - Business Practices**

**Contracting Out**

**12. a)** Did your firm contract out biotechnology related activities in 2001?

12000  No **▶** Go to question 12d)

Yes **▶** For each partner type listed below, please indicate the number and value of contracts for each group listed.

Partner Type	Number of Contracts 0	Total Value of Contract in 2001 for (\$,000)			
		Purpose of Contract			
		R&D 1	Regulatory/ clinical 2	Management/ Production 3	Other 4
12100 Private Entities (C.R.O's / other Firms, etc)		\$ ,000	\$ ,000	\$ ,000	\$ ,000
12110 Public Entities (Universities / Government Labs.)		\$ ,000	\$ ,000	\$ ,000	\$ ,000

**b)** Did you contract out to organizations outside of Canada?

12200  No **▶** Go to question 13

Yes **▶** For each organization listed below, please indicate the percentage (%) of your firm's total contracting out in 2001.

Organization	% of total contracting out
12300 Private research lab	%
12310 University/Hospital	%
12320 Government lab	%
12330 Other biotechnology firm	%
12340 Other, Please Specify:	%

**c)** Rate the level of importance of each of the following reasons on your decision to contract out.

Reasons for Contracting Out	Importance				
	Low 1	2	3	4	High 5
12400 Knowledge not available internally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12410 Access outside scientific expertise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Cost Reduction Related to:</b>					
12420 R&D Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12430 Regulatory/Clinical Affairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12440 Production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12450 Precursor to a formal agreement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12460 Reduce risk/exposure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12470 Other, Please Specify:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**d) Does your firm provide contract services to other firms or organizations?**

12500  No ► Go to question 13

Yes ► For each type of contract services listed below, please indicate the number of contracts entered into in 2001 and the revenues received for each category.

Contract Services		Number of contracts entered in 2001 0	Revenue received from this source in 2001 1
12600	Routine Lab services		\$ ,000
12610	Specialized Lab services		\$ ,000
12620	Production/manufacturing services		\$ ,000
12630	Other, Please Specify: _____		\$ ,000
12640	<b>Total</b>		\$ ,000

**Collaborative Arrangements**

**Cooperative and collaborative arrangements** involve the active participation in projects between your company and other companies or organizations in order to develop and/or continue work on new or significantly improved biotechnology processes and/or products. **Pure contracting-out work is not regarded as collaboration.**

**13. a) Was your firm involved in biotechnology-related cooperative/collaborative arrangements with other companies or organizations in 2001?**

13000  No ► Go to question 14

Yes ► Provide the number of arrangements by purpose and partner type

Arrangement Purpose	Number of Arrangements by Partner Type			
	Biotech Firm 0	Non-biotech Firm 1	Academic Institution/ Hospital 2	Government lab or agency 3
13100 To conduct research & development (R&D)				
13110 Regulatory affairs				
13120 Access others' patents				
13130 Production/manufacturing				
13140 Access markets/distribution channels				
13150 Access capital				
13160 Access to Intellectual property from partner				
13170 Other, Please Specify _____				
13180 Total number				

## Intellectual Property

**14. a)** Did your firm grant biotechnology related intellectual property (IP) rights to another firm?

<sup>14000</sup>  No ► Go to question 14b)

Yes ► For each type of intellectual property instrument listed below please indicate the number of IP rights granted by country and the total income received from IP licensing in 2001.

Intellectual Property Instrument	Number with Canadian firms 0	Number with USA firms 1	Number with other country firms 2	Revenue from IP licensing in 2001 3
<sup>14100</sup> Licensing Agreement				\$ ,000
<sup>14110</sup> Patents				\$ ,000
<sup>14120</sup> Other, Please Specify _____				\$ ,000

**b)** Did your firm obtain biotechnology related intellectual property rights from another firm?

<sup>14200</sup>  No ► Go to question 15

Yes ► Complete the following table

Intellectual Property Instrument	Number with Canadian firms 0	Number with USA firms 1	Number with other country firms 2	Cost to your firm of obtaining IP in 2001 3
<sup>14300</sup> Licensing Agreement				\$ ,000
<sup>14310</sup> Patents				\$ ,000
<sup>14320</sup> Other, Please Specify _____				\$ ,000

**15. a)** Does your firm have biotechnology related patents or pending patents?

<sup>15000</sup>  No ► Go to question 16

Yes ► How many?

Indicate the distribution of biotechnology related patents and pending patents your firm has by Patent Office

	Canadian Intellectual Property Office (CIPO) 0	U.S. Patent & Trademark Office (USPTO) 1	European Patent Office 2	Other 3
<sup>15100</sup> Existing Patents				
<sup>15110</sup> Pending Patents				

**b)** Provide the number of unique patent applications your company submitted in

Number

<sup>15200</sup> 2000	
<sup>15210</sup> 2001	

## Section 6 - Firm Characteristics and Financial Profile

### Revenues and Research and Development (R&D) Expenditures

**16.** Please complete the following table. If information is not available please provide a carefully considered estimate. Report for fiscal years and in thousands of dollars (\$,000's). If '0' (ZERO) please indicate, do not leave blanks.

	2000 0	2001 1	2004 Forecast 2
<sup>16000</sup> Total Firm Sales/Revenues (all sources)	\$ ,000	\$ ,000	\$ ,000
<sup>16010</sup> % of revenues from Biotechnology	%	%	%
<sup>16020</sup> Total R&D spending	\$ ,000	\$ ,000	\$ ,000
<sup>16030</sup> Total spending on Biotechnology R&D	\$ ,000	\$ ,000	\$ ,000
<sup>16040</sup> % of Biotechnology R&D spending contracted out	%	%	%

**17.** Does your firm have sales of biotechnology products?  
 17000  No ► Go to question 18  
 Yes ► What percentage of your sales of biotechnology products came from.

	%
Direct sales to consumers or distributors	17100
Products sold to other firms to be used as inputs	17110

**Firm History**

**18.** Is your firm a public firm?  
 18000  No ► Go to question 19  
 Yes ► What year was the Initial Public Offering (IPO)?

**19.** What year was your firm or spin-off established?

**20.** Has your firm merged with another firm? (Include acquisition of another firm or by another firm)  
 20000  No ► Go to question 21  
 Yes ► What year did the merge take place?

**21.** Is your firm a subsidiary of a Multi-National Enterprise (MNE)?  
 21000  No ► Go to question 22  
 Yes

**22. a)** Is your firm a spin-off? A spin-off is defined as a new firm created to transfer and commercialize inventions and technology developed in universities, firms or laboratories.  
 22000  No ► Go to question 23  
 Yes ► Was your firm a spin-off from ►

- University/hospital  22100
- Another Biotech company  22110
- Non-biotech firm  22120
- Government Agency/lab  22130
- Other, Please Specify  22140

**Raising Capital**

A great deal of attention has focused on the ability of biotechnology firms to raise capital and the challenges of raising capital. Questions in this section are intended to collect information in order to address this critical issue facing the biotechnology sector.

**23. a)** Did your firm attempt to raise capital for biotechnology related purposes in 2001?  
 23000  No ► Go to question 23h)  
 Yes ► Were you successful in raising capital?  
 23100  No ► Go to question 23c)  
 Yes ► How much  \$ \_\_\_\_\_ ,000

**b)** Did you reach your target?  
 23200  No ► Go to question 23c)  
 Yes ► Go to question 23d)

**23. c) What reasons did the lender give in limiting or refusing your request for capital?**

Check all that apply.

- Biotechnology product/process not sufficiently developed  23300
- Biotechnology product line or portfolio limited in scope  23310
- Insufficient specific management skills/expertise  23320
- Capital not available due to market conditions  23330
- Further product development or proof of concept required  23340
- Lender does not fund development projects  23350
- Other, Please Specify  23360

\_\_\_\_\_

**d) What sources provided funding?**

	% of total raised from each source?
Canadian based Venture Capital	23400 %
American based Venture Capital	23410 %
Conventional sources (i.e. banks)	23420 %
Angel Investors/Family	23430 %
Government sources	23440 %
Other, Please Specify	23450 %
_____	%

**e) For your most important biotechnology product or process, please indicate the current stage of development.**

**Stage of Development**

- R&D  23500
- Pre-Clinical  23510
- Clinical Trials  23520
- Market Entry  23530

**For your most important biotechnology product or process, please indicate total spending since the beginning of development.**

	Stage of Development	Total spending up to and including current stage
23600	R&D	\$ _____,000
23610	Pre-Clinical	\$ _____,000
23620	Clinical Trials	\$ _____,000
23630	Market Entry	\$ _____,000

**For your most important biotechnology product or process, please estimate the total amount of capital required to complete each stage, as well as the total capital available.**

	Stage of Development	Total additional capital required to complete stage <small>1</small>	Total capital available to complete stage (include all committed funds) <small>2</small>
23700	R&D	\$ _____,000	\$ _____,000
23710	Pre-Clinical	\$ _____,000	\$ _____,000
23720	Clinical Trials	\$ _____,000	\$ _____,000
23730	Market Entry	\$ _____,000	\$ _____,000

**23. f)** How long do you anticipate this capital (committed and on hand) lasting?

Years  Months

**g)** Why did you raise or attempt to raise capital? Indicate each category that applies to your firm

- 23900  R&D purposes/Expand R&D capacity
- 23910  Repay current investors
- 23920  Commercialize current R&D projects
- 23930  Clinical/regulatory expenses
- 23940  Develop production/manufacturing capability
- 23950  Other, Please Specify:

**h)** Do you plan on raising capital in 2002?

- 24000  No ► Go to question 24
- Yes ► How much do you plan to raise? ►
  - < \$1,000,000  24010
  - \$1,000,000-\$5,000,000  24020
  - > \$5,000,000  24030

**Tax Incentives**

**24. a)** Did your firm have biotechnology R&D expenditures in any of the previous 5 years?

- 24100  No ► Go to question 26
- Yes ► In the past 5 years did your firm apply for benefits for biotechnology related activities under the Scientific Research and Experimental Development (SR&ED) tax program?
  - 24200  Yes ► How much did you apply for in 2001?  \$ \_\_\_\_\_ ,000 ► Go to question 24b
  - No ► Why?
    - Complexity of application process  24300
    - Uncertainty of eligibility  24310
    - Did not meet eligibility requirements  24320
    - Other, Please Specify:  24330

**b)** Have any of your SR&ED credits expired?

- 24400  No
- Yes

**25.** Did your firm apply for any provincial R&D tax benefit or incentive?

25000  Yes

No ► Why did you not apply?

Complexity of application process  25100

Uncertainty of eligibility  25110

Did not meet eligibility requirements  25120

Other, Please Specify  25130

**Imports & Exports**

**26.** Did your firm export biotechnology products?

26000  No ► Go to question 27

Yes ► Please complete the following table. Report for fiscal years and in thousands of dollars (\$,000's). If '0' (ZERO) please indicate, do not leave blanks.

	2000 0	2001 1	Forecast for 2004 2
26100 Total Exports Revenues (all sources)	\$ ,000	\$ ,000	\$ ,000
26110 % export revenues from Biotechnology	%	%	%

**Regional Distribution**

26200 % export revenues to US	%	%	%
26210 % export revenues to Europe	%	%	%
26220 % export revenues to Asia	%	%	%
26230 % export revenues to other regions	%	%	%

**27.** Did your firm import biotechnology products?

27000  No ► Go to question 28

Yes ► Please complete the following table. Report for fiscal years and in thousands of dollars (\$,000's). If '0' (ZERO) please indicate, do not leave blanks.

	2000 0	2001 1	Forecast for 2004 2
27100 Total Import Expenditures (all sources)	\$ ,000	\$ ,000	\$ ,000
27110 % import expenditures from Biotechnology	%	%	%

**Regional Distribution**

27200 % import expenditures to US	%	%	%
27210 % import expenditures to Europe	%	%	%
27220 % import expenditures to Asia	%	%	%
27230 % import expenditures to other regions	%	%	%

**Strategies Used in 2001**

**28.** In the table below rate the significance of each of the following strategies on your firm's performance in 2001.

**Importance**

<b>Low</b>					<b>High</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	

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**Knowledge development strategies**

28000	Captured and used knowledge obtained from other industry sources such as industry associations, competitors, clients and suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28010	Captured and used knowledge obtained from public research institutions including universities and government laboratories	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28020	Used and updated databases of scientific information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28030	Developed firm policies and practices for knowledge/intellectual property protection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28040	Developed/encouraged staff education/upgrading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28050	Conducted an Intellectual Property Audit to ensure protection of products and processes at all stages of development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Business strategies**

28100	Increased firm size through acquisition, merger or joint venture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28110	Downsized operations of the firm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28120	Entered product trials/adapted products or processes for increased market penetration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28130	Began new research & development project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28140	Expanded into foreign markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28150	Other, Please Specify: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**29 a)** Does your firm develop, produce or sell **Living Modified Organisms (LMO)**?

Living modified organism means any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology. A living organism means any biological entity capable of transferring or replicating genetic material, including sterile organisms, viruses and viroids.  
 Source: Cartagena Protocol on Biosafety

- 29000  No
- Yes ► If yes, how many unique products based on living modified organisms does your firm have at each of the following stages?
- |                              |       |       |
|------------------------------|-------|-------|
| Research & Development Stage | _____ | 29100 |
| Clinical/Regulatory stage    | _____ | 29110 |
| Market stage                 | _____ | 29120 |
| Total                        | _____ | 29130 |

**b)** Did your firm export living modified organisms in 2001?

- 29200  No
- Yes ► If yes, how many unique products based on living modified organisms did you export? \_\_\_\_\_ 29210
- How many unique living modified organisms did you export to
- |               |       |       |
|---------------|-------|-------|
| United States | _____ | 29300 |
| Europe        | _____ | 29310 |
| Other         | _____ | 29320 |

Comments <sup>30000</sup>

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**Thank you for your assistance.**  
**Return the questionnaire in the accompanying self addressed prepaid envelope.**