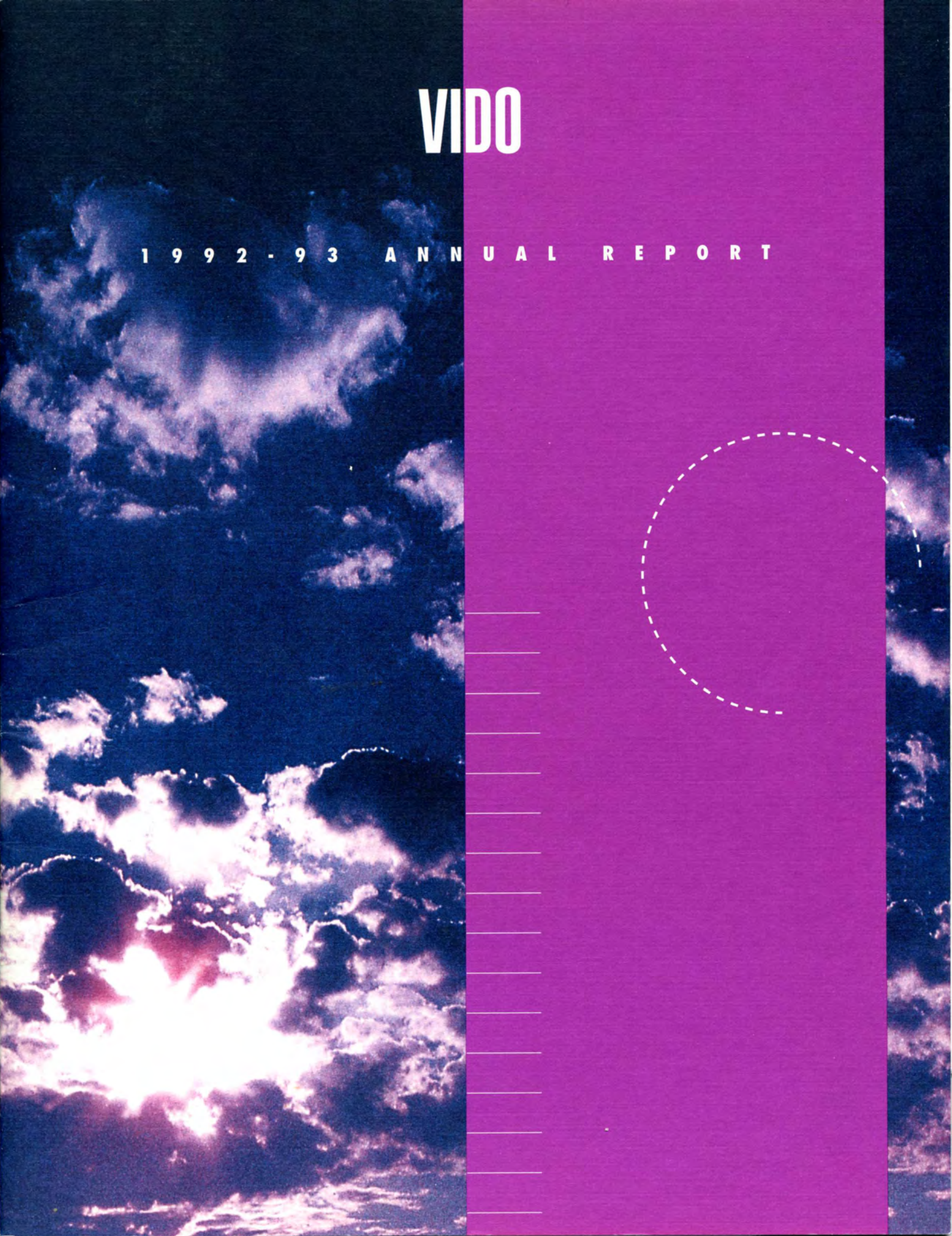
VIDO

1992-93 ANNUAL REPORT



GOALS OF VIDO

1) To serve the livestock industry through research on the common infectious diseases of farm animals and poultry.

2) To help provide higher quality food to consumers through research on safe and effective animal health and performance products, preventive medicine programs and improved livestock management.

3) To fill the gap between scientific discoveries in the laboratory and their practical application on the farm.

4) To use science, technology and innovation to improve the economic well-being of the agri-food system.

5) To reduce the suffering and wastage of animals caused by disease.

6) To improve human health by encouraging the application of results from animal health research to the development of human health products and by reducing diseases that are directly transmissible from animals to man.

VIDO SPINS OFF BIOSTAR INC.

On December 15, 1993, VIDO and the University of Saskatchewan achieved another goal of importance to Canada. On that date, they "privatized" BIOSTAR Inc. by selling controlling interest in the Company to a syndicate of Canadian investors. Prior to that time, BIOSTAR was owned 100% by the BIOSTAR Trust, of which VIDO and the University are the beneficial shareholders. The BIOSTAR Trust will continue to be a minority shareholder in the Company.

The $10.9 M of equity raised in this financing will be used to complete the commercialization of products developed at VIDO, to contract additional research and development with VIDO and other institutions, and to establish a product development and manufacturing facility in Saskatoon. This initiative will help to ensure that products developed at VIDO are produced and marketed in Canada as quickly as possible, and will also strengthen Canada's industrial infrastructure.

1. *Why did VIDO undertake this venture?*

VIDO and the University of Saskatchewan incorporated BIOSTAR in 1983, and VIDO managed the Company until the time of its privatization. During the ten-year period, VIDO operated BIOSTAR as an arms-length company with three major objectives.

1) To transfer products developed at VIDO to commercial companies for manufacturing and marketing. For example, through BIOSTAR VIDO licensed the manufacturing and marketing rights for several products developed at VIDO including Ecolan, Ecolan RC, and Hevlan TC to Langford Inc.

2) To contract research from other commercial companies.

3) To help fund VIDO. Through research chairs and contract research, BIOSTAR has provided as much as $789,000 per year to support VIDO. In fact, during the five-year period from 1988 to 1993, BIOSTAR was the second largest funder of VIDO, next to NSERC.

Therefore, BIOSTAR's initial role was not to produce and market VIDO's products, but to serve as a mechanism through which VIDO could interact with commercial companies. However, as VIDO grew through the 1980s, it built a critical mass of technology and products. By 1989, there were enough products under development to encourage further growth of BIOSTAR, and the decision was made to spin it off and develop it into a manufacturing and marketing company in its own right.

2. *Will BIOSTAR add value to VIDO's research?*

The answer is yes. VIDO focuses on infectious diseases, which have been identified as problems by livestock producers, and attempts to develop ways of reducing economic losses caused by them. Where these diseases can be prevented by vaccination, VIDO attempts to identify the components or antigens which need to be incorporated into a vaccine to provide improved protection. However, the antigens themselves are not products, and BIOSTAR's objective is to complete the commercialization of products by developing the manufacturing processes needed to produce the antigens and by completing field trials and registration of finished product formulations. In many instances, this development process costs as much or more as the original research carried out by VIDO. For VIDO to carry out this product development would not only require additional resources, but would detract from the focused research that VIDO does best.

3. *Will the privatization of BIOSTAR alter how VIDO uses funding provided by livestock producers and others?*

The answer is no. VIDO's mandate of serving the livestock industry through research will continue and will be enhanced by BIOSTAR's activities. Producers will continue to define the research priorities for VIDO and VIDO will continue to seek financial support from livestock producer groups, granting agencies, charitable foundations, governments, and others. Therefore, VIDO's research direction will continue to be set by the 13-person Board of Directors which is made up by five representatives from the livestock and poultry industries, two at-large members, three government representatives, and two from the University of Saskatchewan in addition to the Director. However, VIDO has a seat on the BIOSTAR Board currently held by Dr. Ed Moss from Bassano, Alberta. Dr. Moss is also the current Vice-Chairman of the VIDO Board.

4. *Who are the owners of BIOSTAR?*

At the present time, there are nine shareholders in the Company: the BIOSTAR Trust, of which VIDO and the University of Saskatchewan are the beneficial shareholders; MDS Health Ventures; the Saskatchewan Government Growth Fund Ltd.; the International Center for Agricultural Science and Technology (ICAST); Working Ventures Canadian Fund Inc.; Vencap Equities Alberta Ltd.; the Federal Business Development Bank; CIC Industrial Interests Inc.; and the Health Care and Biotechnology Venture Fund.

5. *What are the commercial arrangements between VIDO and BIOSTAR?*

VIDO has a long history of commercializing products which it has developed, starting in 1978 with the licensing to Connaught Laboratories Ltd., of Vicogen, VIDO's first product. As described above, the commercial rights to later products were licensed to other companies, such as Langford Inc., through BIOSTAR. Under the current agreement, BIOSTAR has a first right of refusal to new products developed at VIDO. Prior to exercising this right, BIOSTAR must demonstrate to VIDO that it has the resources and is capable of commercializing a specific product. If BIOSTAR is not able to do this, VIDO has the option of licensing that product elsewhere. In exchange for this right, VIDO receives significant financial support from BIOSTAR in the form of research contracts and royalties. In addition, BIOSTAR is committed to adding substantial value to products on which VIDO is doing research, but which the Organization does not have the expertise or resources to take to the commercial stage. After extensive discussion, VIDO felt no other animal health company would provide the Organization with the ability to retain control of its research activities, yet supply the financial opportunities and synergy of development that has been included in VIDO's current arrangement with BIOSTAR.

6. *How does the BIOSTAR arrangement affect VIDO's interaction with other companies?*

As stated, BIOSTAR has right of first refusal on VIDO's products and technology in many, but not all, areas of research. In those areas, VIDO is currently working with other companies. If BIOSTAR cannot demonstrate to VIDO that it can take a VIDO product to the market in a timely, effective manner or if BIOSTAR is not interested in a particular product, then VIDO can commercialize such products through other companies.

7. *What is the scope of BIOSTAR's marketing efforts?*

For the past few years, BIOSTAR has produced and marketed in Canada three vaccines developed by VIDO for the prevention of Bovine Respiratory Disease. These include the world's first genetically engineered vaccine for Pasteurella haemolytica (PNEUMO-STAR), the first extract vaccine for Haemophilus somnus (SOMNU-STAR), plus a combination of these two vaccines (PNEUMO-STAR Ph). BIOSTAR will continue to produce and market products in Canada thereby bringing VIDO products to end users as quickly as possible. In addition, BIOSTAR has signed a major marketing agreement with SmithKline Beecham Animal Health, one of the world's largest animal health companies for international marketing. This agreement will give VIDO access to greater royalties than could be achieved in other arrangements.

8. *How will VIDO benefit financially from this privatization?*

VIDO will benefit in several ways.

1) by receiving increased royalties from product sales in Canadian and international markets.

2) from additional research contracts with BIOSTAR and its associates.

3) BIOSTAR will assume much of the cost of protecting VIDO's proprietary information through its patents.

4) As a beneficial shareholder through the BIOSTAR Trust, VIDO may achieve future revenue as the value of BIOSTAR shares increase.

This will help VIDO to expand its scope and direct research resources to new disease problems.

All those involved over the past number of years with the initiative to seek equity funding, marketing partners, and development of BIOSTAR are to be congratulated on a job well done. For further information, please contact Dr. Stephen Acres, President, BIOSTAR Inc., Box 1000, Sub. P.O. #6, Saskatoon, Saskatchewan, S7N 0W0 tel: (306) 966-7473; fax (306) 966-7478 or Dr. Lorne Babiuk, Director, VIDO, 124 Veterinary Road, Saskatoon, Saskatchewan, S7N 0W0 tel: (306) 966-7465; fax: (306) 966-7478.

VIDO

University of Saskatchewan
124 Veterinary Road
Saskatoon, Saskatchewan, Canada, S7N 0W0
Ph. (306) 966-7465 Fax (306) 966-7478

Origins

In 1975, VIDO was established at the University of Saskatchewan in Saskatoon with a grant provided by the Devonian Group of Charitable Foundations of Calgary. The Foundation was joined by the Provinces of Saskatchewan and Alberta, and the University which supported the original development of the Organization. As a financially self-reliant national Organization of the University, it receives on-going funding from governments, charitable foundations, the livestock and poultry industries, federal and provincial granting agencies, contracts and other private sources. The Provinces of Saskatchewan and Alberta, and the University of Saskatchewan continue to be important supporters of VIDO.

Mandate

VIDO's mandate is to serve livestock and poultry producers and consumers by developing safe and effective animal health and performance products, preventive medicine programs and improved livestock management techniques and information.

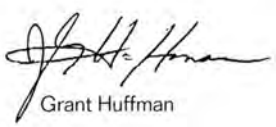
Report from the Chairman

Grant Huffman
Chairman

Bob Hunsberger
Vice-Chairman

As a Member of the VIDO Board of Directors for the past four years, I have witnessed a continued evolution of a world class research organization that enjoys a unique relationship to the livestock and poultry producers, agribusiness, and government. This relationship was one of the founding principles on which VIDO was initiated and is still reflected by the broad spectrum of interests and backgrounds of the Board of Directors. VIDO's commitment to take scientific discoveries from the laboratory to the farm has served it well with the ever increasing competition for scarce funds. VIDO's open and practical approach to research and its development will hopefully be seen to be both appropriate and attractive to potential funders. As a producer, I can think of no other Organization that strives as hard to be responsive to the animal health and production needs of the livestock industry. One specific area of personal interest to me as a producer is the vision that VIDO has to adapt some of its more traditional vaccine development procedures against infectious diseases and capitalize on these discoveries to improve animal production through "natural" immunological methods which will improve the welfare of animals as well as their productivity.

I would like to give my personal thanks to all of the Board Members who have assisted me in guiding VIDO during the past year and extend special appreciation to the management, scientists, and staff of VIDO for their continued vision and continued dedication to the Organization. I would also like to wish Dr. Stephen Acres, former Director of VIDO and now President of BIOSTAR success as he moves BIOSTAR into the commercial arena. This interaction between VIDO and BIOSTAR is bound to provide very significant benefits to the livestock industry, society, and help Canada's research and development infrastructure and competitiveness internationally.



Grant Huffman

1992-93 VIDO BOARD OF DIRECTORS

(Back Row – Left to Right)

P. Hodgman (Executive Officer), J. Doherty, L. Babiuk (Director), D. Johnson, R. Byle, A. Livingston, D. Taylor, R. Christian, G. Schoepp, F. Van Ingen

(Front Row – Left to Right)

R. Hunsberger (Vice-Chairman), G. Huffman (Chairman), E. Moss, A. Hingston

Report from Management

Lorne Babiuk

The past year has been one of transition with the appointment of Dr. Lorne Babiuk as the new Director of VIDO replacing Dr. Stephen Acres who has taken up the position of President of BIOSTAR Inc. In parallel with the appointment of a new Director, the management of the research programs at VIDO has been altered to more adequately address both the needs of the Organization and the trends in research and development of the 90s. Rather than retaining the organizational structure around the classical disciplines of virology, bacteriology, immunology and veterinary services, we have realigned our programs into Preclinical Research and Development with Dr. Andrew Potter as Manager, and Clinical Research and Development under the direction of Dr. Richard Harland. Simultaneously, we restructured the research and development activities of VIDO around the "team" concept with Project Teams for each of the major disease areas. These Project Teams are made up of individuals with the varied expertise required to drive a project from the initial research phase including molecular biology research, to clinical testing and technology transfer. This structure is proving to be extremely useful in ensuring that all of the expertise is available, not only to complete the project in as short a time as possible, but also to ensure that the resulting product can be scaled up and meet regulatory approval.

Mrs. Carol Martel, Manager of Financial Operations, has taken on the responsibility for the financial affairs of VIDO. Mr. Paul Hodgman as Executive Officer remains responsible for external fund raising, communications, public relations, and strategic planning.

Financial Survival in the 1990s

In spite of VIDO's very successful track record, we, like many organizations, are experiencing erosion of core funding required to maintain the infrastructure of the Organization. The reason for this is that the majority of VIDO's funding comes from peer-reviewed grants and contracts designed to cover only the materials, supplies, and other direct research, but not the scientists' salaries or indirect infrastructure costs required to conduct the research. Unlike most other academic organizations, VIDO does not have the salaries of its scientists contributed through traditional government departments. In order to maintain VIDO's vitality and competitive edge, we need to have a stable core funding base for salaries of our key scientists. They can then compete for external funding to cover the direct costs of the research as well as the transfer of the technology to the commercial sector and the livestock community. VIDO's goal during the next year is to secure core funding so that it can retain its present core of key scientists and maintain the critical mass that has been established. This is a crucial objective if VIDO hopes to complete the projects presently in progress in a timely manner.

Core funding is also required for protection of intellectual property (novel discoveries). One of the keys to VIDO's success is its ability to identify and protect intellectual property through patents. This, in turn, allows us to enter strategic alliances with commercial companies which then complete the development of our technology. Because of the importance of patenting and the commercial development of biologicals, VIDO maintains an aggressive patenting policy which has resulted in seven (7) issued patents and twenty-seven (27) patents pending. Unfortunately, the patenting process is a very expensive one costing between $100,000 to $200,000 per patent. Generally, granting agencies are not prepared to fund patent filing or maintenance costs. Thus, VIDO must find funds to cover patenting costs in order to ensure its continued success; hence the need for core funds.

Paul Hodgman

Research

Richard Harland

VIDO continues to focus its research activities for the livestock and poultry industries in two major areas: (1) the common infectious diseases, and (2) performance and enhancement. In the infectious disease area, we continue to conduct research designed to understand how different viruses and bacteria cause disease and how the animal responds to these infections. These studies involve the identification of specific components (proteins, glycoproteins) involved in inducing protective immunity against the pathogen. In parallel with identifying the important proteins of the organisms, we also identify the genes coding for these proteins and develop systems to produce large quantities of these individual proteins (subunit vaccines) economically. These are then incorporated in different formulations (adjuvants) to stimulate the appropriate immune response.

In addition to developing subunit vaccines, VIDO is also genetically engineering novel live viral and bacterial vaccines. These types of vaccines have the potential of being much safer and more efficacious than the conventional modified-live vaccines presently marketed. The reason for this increased safety is that we can identify the specific disease-causing genes (virulent genes), and remove (delete) them from the organisms. Presently, conventional vaccines are selected following *in vitro* growth to produce mutations that reduce the disease-inducing capacity of the organism. Since these are random mutations, they have the potential to revert back to virulence, causing the disease once injected into the animal. The gene deleted organism cannot revert back to virulence since the entire gene is needed to be reacquired. Thus, these vaccines should not only be extremely effective, but also very safe.

In parallel with the development of gene deleted viruses and bacteria, we are developing technology to introduce genes coding for protective antigens from other disease-causing organisms and incorporate them into the gene deleted organism. This is called a vector. In this way, immunity will be developed against the organism carrying the genes as well as to the disease-causing organism whose gene was added to the vector. This approach is being used with bovine herpesvirus, bovine adenovirus, and *E. coli*.

New subunit vaccines against bovine herpesvirus-1 and *Actinobacillus pleuropneumonia* are in the final stages of formulation and scale-up. It is anticipated that a submission will be made to Agriculture Canada in early 1994 for approval to conduct field trials required for licensing. The bovine herpesvirus-1 (IBR) vaccine, with a different formulation from that to be registered in Canada, is also being tested extensively in the Netherlands. This trial is sponsored by the Dutch government and will

involve immunizing over 10,000 dairy animals. These results should provide extensive data on both the efficacy and safety of this vaccine. Furthermore, we have developed a diagnostic test to differentiate vaccinated animals from latent carriers of the disease. This will be very useful in the export of live and breeding stock animals. This combination of a subunit vaccine with a differentiating diagnostic test will provide the opportunity to eradicate this disease over time.

As a result of our expertise in molecular biology and immunology, VIDO initiated a program two years ago designed to investigate the potential of reducing aggression and increasing performance of animals through immunological control of the endocrine (hormone) system. One of the projects we are working on is to develop a vaccine to regulate the level of gonadotrophin releasing hormone (GnRH), a hormone which can control the level of testosterone in male pigs. We hope to reduce aggression and "boar taint" in male pigs, as well as improve growth and produce higher quality leaner carcasses. This approach has significant advantages over surgical castration which is presently practised and also helps in addressing concerns expressed by others relating to the welfare of animals.

Evolution of Biostar Inc.

BIOSTAR Inc. is a federally incorporated company which was established by VIDO at the University of Saskatchewan in 1983 to act as a receptor company to commercialize innovations and developments made at VIDO and to transfer these developments to the user sector. With VIDO's success in developing useful products, it became evident a few years ago that many new products would be forthcoming from its research, and the further development of BIOSTAR would aid greatly in getting these products to Canadian producers as quickly as possible. In addition, it would enable VIDO to achieve greater royalties and research contracts. Also, we felt that it would be more profitable for VIDO and Canada to manufacture and market our products through BIOSTAR rather than licensing the manufacturing rights to other companies. To capitalize on these opportunities, VIDO and the University have helped BIOSTAR complete most of the requirements for privatization of the Company. It is anticipated that within the next few months, sufficient capital will be raised to provide the money needed not only to complete the development and registration of a number of products forthcoming from VIDO's research, but also to establish a manufacturing facility in Saskatoon to produce products for the international market. This is additional tangible evidence of the benefits that VIDO has contributed to the animal health and biotechnology industries in Canada.

Andy Potter

Board of Directors

Since VIDO's inception, its activities have been guided by a 13-member Board representing various livestock and poultry industries, the agri-business community, the University of Saskatchewan, as well as both federal and provincial governments. This blend of expertise has been instrumental in guiding the Organization through each new era of growth and transition. In my first year as Director, I thank the entire Board for the guidance they have provided me to help direct the Organization throughout these economically difficult times. I especially thank Grant Huffman for his leadership as Chairman of the Board during this last year and Jim Doherty, Director, both of whom are retiring Board Members. Their four-year term on the Board will be remembered for the significant contributions each made not only to VIDO, but to me personally. I would also like to welcome to the Board the following new Directors: Dr. Lorne Hepworth from Kincardine, Ontario, and Mrs. Deborah Whale from Alma, Ontario. The Management Team looks forward to working with all Directors of the Board and especially with Mr. Bob Hunsberger, Chairman of the Board and Dr. Ed Moss, Vice-Chairman of the Board.

Carol Martel

Management and Staff

In many businesses, location is considered to play a crucial role in an organization's success. In VIDO's case, the major contributor to our success is our people. VIDO is fortunate to have a dedicated management and staff which is totally committed to the research Organization and Canada's livestock and biotechnology industries. Without such dedication, VIDO would not be able to carry out its focused research efforts and transfer the technology to the end users. Their combined talents, dedication, and willingness to work as team members make VIDO a recognized centre of agricultural biotechnology not only in Canada, but internationally. On behalf of the Board and myself, I offer a special note of thanks to all the people working at VIDO for their continued support during this past year.

Auditors' Report

To the Board of Directors
Veterinary Infectious Disease Organization (VIDO),
University of Saskatchewan

We have audited the combined balance sheet of the University of Saskatchewan – Veterinary Infectious Disease Organization as at September 30, 1993 and the statements of income, expenditure and fund balance (Research Trust, Capital Trust, and Technology Development Trust) and combined statement of changes in financial position for the year then ended. These financial statements are the responsibility of the Organization's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In common with many non-profit organizations, the Organization derives part of its income in the form of donations and certain grants, the completeness of which is not susceptible to satisfactory audit verification. Accordingly, our verification of revenues from these sources was limited to the amounts recorded in the records of the Organization, and we were not able to determine whether any adjustments might be necessary to donations and grant revenue, excess of income over expenditure, assets and fund balance.

In our opinion, except for the effect of adjustments, if any, which we might have determined to be necessary had we been able to satisfy ourselves concerning the completeness of donations and certain grants referred to in the preceding paragraph, these financial statements present fairly, in all material respects, the financial position of the Organization as at September 30, 1993 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles.

Deloitte & Touche

Chartered Accountants
December 15, 1993

University of Saskatchewan
Veterinary Infectious Disease Organization (VIDO)

Research Trust – Statement of Income, Expenditure and Fund Balance

Year ended September 30, 1993

	1993	1992
INCOME		
Donations and unconditional grants (Schedule 1)		
Livestock and poultry industries – beef	$ 150,700	$ 85,700
– dairy	–	25,000
– swine	105,198	121,132
– turkey	12,000	36,000
Provincial governments	27,388	77,457
Other contributors	190,000	190,155
	485,286	535,444
Conditional grants (Schedule 2)	1,930,435	2,342,461
Contract research – Commercial	388,439	589,573
– Government	300,000	380,286
Contract services	235,765	86,263
Royalties	79,778	35,925
Interest	55,530	108,646
Animal services	123,812	138,502
License fees	–	34,320
	3,599,045	4,251,420
EXPENDITURE		
Salaries and fringe benefits	2,389,590	2,410,810
Materials and supplies	767,884	914,270
Animal services	220,518	112,368
Equipment and service agreements	57,228	337,906
Travel and recruiting	176,163	141,220
Patents and legal fees	46,467	66,334
Other expenditures (Note 7)	352,082	288,586
	4,009,932	4,271,494
EXCESS OF (EXPENDITURE OVER INCOME)	(410,887)	(20,074)
FUND BALANCE, BEGINNING OF YEAR	1,180,607	1,215,681
	769,720	1,195,607
TRANSFER TO CAPITAL TRUST	–	(15,000)
FUND BALANCE, END OF YEAR	$ 769,720	$1,180,607

University of Saskatchewan
Veterinary Infectious Disease Organization (VIDO)

Capital Trust – Statement of Income, Expenditure and Fund Balance

Year ended September 30, 1993

	1993	1992
FUND BALANCE, BEGINNING OF YEAR	$ 30,000	$ 15,000
TRANSFER FROM RESEARCH TRUST	–	15,000
FUND BALANCE, END OF YEAR	$ 30,000	$ 30,000

University of Saskatchewan
Veterinary Infectious Disease Organization (VIDO)

Technology Development Trust – Statement of Income, Expenditure and Fund Balance

Year ended September 30, 1993

	1993	1992
INCOME FROM TECHNOLOGY ACCESS AGREEMENTS (NOTE 9(c))	$4,699,876	$ –
FUND BALANCE, END OF YEAR	$4,699,876	$ –

University of Saskatchewan
Veterinary Infectious Disease Organization (VIDO)

Combined Balance Sheet

September 30, 1993

	1993	1992
ASSETS		
Current Assets		
Cash on hand	$ 22,240	$ 144,674
Funds held (claim on cash) – University of Saskatchewan	(252,236)	84,101
Due from University of Saskatchewan – operating fund	836,749	426,276
Accounts receivable (Note 3)	852,612	861,348
Inventories (Note 4)	112,157	42,187
	1,571,522	1,558,586
Investments (quoted market value $211,420, 1992 – $250,250)	200,676	252,113
Debenture Receivable (Note 5)	4,699,876	–
Capital Assets		
Site and improvements	146,503	146,503
Furnishings, fixtures and equipment	459,752	459,752
Buildings and facilities	5,036,996	5,036,996
	5,643,251	5,643,251
	$12,115,325	$7,453,950
LIABILITIES		
Current Liabilities		
Accounts payable	$ 9,606	$ 16,902
Unearned revenue (Note 6)	962,872	558,190
Long-term debt	–	25,000
	972,478	600,092
EQUITY		
Capital Assets	5,643,251	5,643,251
Research Trust	769,720	1,180,607
Capital Trust	30,000	30,000
Technology Development Trust	4,699,876	–
	11,142,847	6,853,858
	$12,115,325	$7,453,950

APPROVED BY THE BOARD:

Director

Trustee

University of Saskatchewan
Veterinary Infectious Disease Organization (VIDO)

Combined Statement of Changes in Financial Position

Year ended September 30, 1993

	1993	1992
OPERATING ACTIVITIES		
Working capital from operations		
Research Trust – Excess of (expenditure over income)	$ (410,887)	$ (20,074)
Technology Development Trust – Income	4,699,876	–
	4,288,989	(20,074)
Changes in non-cash operating working capital		
Due from University of Saskatchewan	(410,473)	605,682
Accounts receivable	8,736	259,390
Inventories	(69,970)	56,781
Accounts payable	(7,296)	2,444
Unearned revenue	404,682	(921,082)
Cash used in operating activities	4,214,668	(16,859)
INVESTING ACTIVITIES		
Increase in debenture	(4,699,876)	–
Reductions in investments	51,437	256,526
	(4,648,439)	256,526
FINANCING ACTIVITIES		
Repayment of loan payable	(25,000)	(25,000)
INCREASE (DECREASE) IN CASH	(458,771)	214,667
CASH, BEGINNING OF YEAR	228,775	14,108
CASH (DEFICIENCY), END OF YEAR	$ (229,996)	$ 228,775
Cash (Deficiency) consists of:		
Cash on hand	$ 22,240	$ 144,674
Funds held (claim on cash) – University of Saskatchewan	(252,236)	84,101
	$ (229,996)	$ 228,775

Notes to the Financial Statements

September 30, 1993

1. ESTABLISHING AGREEMENT

The Organization was established by an Agreement dated August 11, 1975 between the Devonian Foundation of Calgary, Alberta, the Province of Alberta, the Province of Saskatchewan and the University of Saskatchewan to conduct research on indigenous infectious diseases of food producing animals.

Effective April 1, 1980 the above Agreement was replaced by a Constitution which provides for a Board of Directors to assume the responsibilities formerly performed by the Board of Advisors and the Governing Committee.

2. SIGNIFICANT ACCOUNTING POLICIES

These financial statements have been prepared in accordance with the following policies:

Fund accounting

Transactions of the Organization are accounted for by fund accounting principles which require classification of resources into funds to reflect the various designated uses. The Research Trust fund consists of those revenues and expenses used in the general operations of the Organization. The Capital Trust fund consists of grants, interest and authorized transfers from the Research Trust for the purpose of acquiring capital assets. Funds are transferred from the Research Trust to operations and to the Capital Trust as approved by the Board of Directors. The Technology Development Trust fund consists of income generated from Technology Access Agreements and will be used for the future development of technology under patent or license. The balance sheet and statement of changes in financial position have been presented on a combined basis reflecting the activities of all funds.

Capital assets

Capital assets are recorded as Capital Trust expenditures when purchased. The same assets are included in the balance sheet as Capital assets offset by the Capital Assets equity account. No depreciation is recorded on the capital assets.

Equipment purchased with Research Trust monies is expensed as purchased, and is not included in the balance sheet as assets.

The Constitution referred to in Note 1 states that all buildings and facilities constructed for the Organization shall be used by it in accordance with the Constitution and upon termination of the Organization, the buildings, facilities and equipment therein shall remain the absolute property of the University of Saskatchewan.

Inventories

Inventories of materials and supplies are valued at the lower of cost and net realizable value. Animal inventory is valued at cost.

Investments

Investments are recorded at cost. The difference between cost and par value of bonds is not amortized but is treated as income or expense in the year of disposal.

Grants and donations

Grants and donations are recognized in these financial statements in the period defined in the terms or conditions of the respective grants or donations.

Grants and donations received without terms or conditions as to the period in which the grant or donation is to be used are recognized in the financial statements when received.

Unearned revenue consists of unexpended funds relating to specific grants and donations and is determined on the percentage of completion basis.

License Fees and Royalties

License fees and royalties are recognized as they are received or earned under the terms of the agreements with licensees.

3. ACCOUNTS RECEIVABLE

	1993	1992
Donations and unconditional grants	$ –	$ 52,076
Conditional grants (Schedule 2)	47,566	165,872
Contract research	208,485	261,812
Contract services	189,732	20,404
Recoverable patent costs	308,256	308,256
Royalties	87,756	40,536
Accrued Interest	10,817	12,392
	$ 852,612	$ 861,348

4. INVENTORIES

	1993	1992
Animals	$ 68,550	$ 15,707
Materials and supplies	43,607	26,480
	$ 112,157	$ 42,187

5. DEBENTURE RECEIVABLE

The Debenture receivable is due from BIOSTAR Inc., bears interest at the rate of 4% per annum and is due December, 1999. The maximum authorized indebtedness under the debenture is $7,000,000. The debenture receivable includes interest of $92,263.

6. UNEARNED REVENUE

	1993	1992
Donations and unconditional grants	$ 25,000	$ 25,000
Conditional grants (Schedule 2)	828,665	553,190
Contract research	109,207	–
	$ 962,872	$ 558,190

7. OTHER EXPENDITURES

Other expenditures consist of VIDO operating accounts which include repairs and maintenance, equipment rental, annual report and technical bulletins, professional fees and Board expenses.

8. INCOME TAXES

The Organization is not subject to either federal or provincial income taxes.

9. RELATED PARTY TRANSACTIONS

a) VIDO is a research affiliate of the University of Saskatchewan. The University of Saskatchewan maintains, as part of its normal operations, various financial and administrative functions relating to VIDO. The financial statements do not include expenditures for administrative and ancillary services, or in-kind support provided by the University of Saskatchewan.

b) The University of Saskatchewan is the beneficiary of a Trust which owns 100% of BIOSTAR Inc., a research and development company which assists VIDO in the development of its products and technologies. During the year VIDO had the following transactions with BIOSTAR Inc.:

	1993	1992
Income from BIOSTAR Inc. to VIDO		
Contract research	$ 120,283	$ 171,759
Contract services	71,743	86,262
Material purchases	–	4,172
Royalties	79,778	40,536
Sponsorship of two industrial research chairs at VIDO in conjunction with NSERC	122,410	149,202
Expenditures by VIDO to BIOSTAR Inc.		
Management service fees	25,979	22,769
Research and veterinary services	9,140	54,510
Equipment lease	28,409	20,876
Expenditures made by VIDO on BIOSTAR Inc.'s behalf	164,021	308,256

At September 30, 1993 the Organization has a receivable from BIOSTAR Inc. of $624,181 (1992 – $411,740).

c) VIDO has entered into technology access agreements relating to specific products with BIOSTAR Inc. Income generated with respect to these agreements is $4,699,876. Consideration for this income is a Debenture Receivable (Note 5).

10. COMPARATIVE FIGURES

Certain of the prior year's figures have been reclassified to conform to the current year's presentation.

11. SUBSEQUENT EVENT

As of December 15, 1993, the University of Saskatchewan, as represented by VIDO signed a Debenture/Debt Transfer Agreement with 598707 Saskatchewan Ltd., the trustee of the BIOSTAR Trust. This agreement transfers the debt obligation including related interest as evidenced by the Debenture made between BIOSTAR Inc. and the University of Saskatchewan, effective December 11, 1991, to 598707 Saskatchewan Ltd. Consideration for the transfer is a Promissory Note of $4,699,876 bearing no interest and due on demand.

University of Saskatchewan
Veterinary Infectious Disease Organization (VIDO)

Schedule 1

Schedule of Donations and Unconditional Grants

Year ended September 30, 1993

	1993	1992
LIVESTOCK AND POULTRY INDUSTRIES		
Beef		
British Columbia Cattlemen's Association	$ 5,000	$ 5,000
Kamloops Stockmen's Association	700	700
Saskatchewan Cattle Marketing Deductions Fund	75,000	75,000
Saskatchewan Wheat Pool	5,000	5,000
Nechako Regional Cattlemen's Association	1,000	–
Ontario Cattlemen's Association	4,000	–
Canadian Association of Animal Breeders	10,000	–
Saskatchewan Horned Cattle Trust Fund	50,000	–
	150,700	85,700
Dairy		
Alberta Milk Producers' Society	–	10,000
Manitoba Milk Producers' Marketing Board	–	10,000
Ontario Milk Marketing Board	–	5,000
	–	25,000
Swine		
Alberta Pork Producers Development Corporation	44,430	40,353
B.C. Hog Marketing Commission	5,483	6,336
Manitoba Pork est.	34,863	33,470
Ontario Pork Producers Marketing Board	–	20,000
SPI Marketing Group	19,334	19,842
Swine Improvement Services Co-operative (SISCO)	1,088	1,131
	105,198	121,132
Turkey		
Canadian Turkey Marketing Agency	12,000	36,000
PROVINCIAL GOVERNMENTS		
Alberta	–	50,000
British Columbia	11,888	11,957
Manitoba	15,500	15,500
	27,388	77,457
OTHER CONTRIBUTORS		
The W. Garfield Weston Foundation	100,000	100,000
Max Bell Foundation	90,000	90,000
Individuals	–	155
	190,000	190,155
	$ 485,286	$ 535,444

University of Saskatchewan
Veterinary Infectious Disease Organization (VIDO)

Schedule 2

Schedule of Conditional Grants and Contracts

Year ended September 30, 1993

	September 30, 1992		1993	September 30, 1993			
	Accounts Receivable	Unearned Revenue	Funds Received	Accounts Receivable	Unearned Revenue	1993 Income	1992 Income
Natural Sciences and Engineering Research Council of Canada (NSERC)							
– Co-operative Research Development	$ –	$ –	$ 377,500	$ –	$ 188,750	$ 188,750	$ 526,337
– Industrial Research Chairs	–	23,343	8,547	–	6,740	25,150	70,462
– Operating, Strategic and Equipment	–	143,437	509,071	–	119,458	533,050	477,456
– Industry Matching	–	–	77,735	–	–	77,735	102,604
– President's Award	–	–	13,750	–	3,438	10,312	–
BIOSTAR Inc. - NSERC Industrial Research	–	70,030	52,380	–	–	122,410	149,202
Canadian Bacterial Diseases Network (CBDN)	–	63,444	332,360	–	68,904	326,900	304,341
Agriculture Canada/NSERC Research Partnerships Grants	66,000	99,000	198,000	–	99,000	132,000	182,700
Medical Research Council	–	35,525	154,275	–	102,850	86,950	17,763
Alberta Agriculture Research Institute (AARI)							
– Matching Grants Program	36,308	10,064	239,253	13,695	99,767	126,937	171,235
– Farming for the Future Program	32,777	19,000	189,025	3,595	31,000	147,844	279,734
Alberta Cattle Commission	–	29,022	38,600	–	42,856	24,766	6,178
Province of Ontario (OMAF) and Agriculture Research Institute of Ontario	15,393	–	25,918	15,138	–	25,663	15,393
National Agricultural Biotechnology Initiative	15,393	–	25,918	15,138	–	25,663	15,393
Saskatchewan Health Research Board Fellowship	–	40,325	57,360	–	43,020	54,665	38,764
Medical Research Council Fellowship	–	–	44,522	–	22,882	21,640	–
University of Minnesota	–	–	–	–	–	–	(15,101)
	$ 165,871	$ 533,190	$2,344,214	$ 47,566	$ 828,665	$1,930,435	$2,342,461

Patents, Publications, Presentations, and Research Collaborators

Patents Issued on Which VIDO Staff are Inventors

United States Patent No 5212156

- Title - SRIF-Related Peptides and Uses Thereof
- Date - May 18, 1993
- Inventors - B. Laarveld, R. Kirkwood, P. Thacker, L. Sordillo, and M. Redmond
- Assignee - University of Saskatchewan

United States Patent No 5234684

- Title - Method for the Prevention and Treatment of Bovine Mastitis
- Date - August 10, 1993
- Inventors - Lorraine Sordillo and Lorne Babiuk
- Assignee - Ciba-Geigy Corporation, Ardsley, New York

United States Patent No 5238823

- Title - Interleukin-2-Leukotoxin Gene Fusions and Uses Thereof
- Date - August 24, 1993
- Inventors - A.A. Potter, M. Campos, H. Hughes
- Assignee - University of Saskatchewan and Ciba-Geigy Canada Ltd.

Research Publications in Scientific Journals

Allan, B., van den Hurk, J., and Potter, A.A. 1993. Characterization of *Escherichia coli* isolated from cases of avian colibacillosis. Can. J. Vet. Res. 57:146-151.

Campos, C., Godson, D., Hughes, H., and Babiuk, L.A. 1993. The role of biological response modifiers in disease control. J. Dairy Sci. 76:2407-2417.

Collins, J.K., Ayers, V.K., Whetstone, C.A., and van Drunen Littel-van den Hurk, S. 1993. Antigenic differences between the major glycoproteins of bovine herpesvirus type-1.1 and bovine encephalitis herpesvirus type 1.3. J. Gen. Virol. 74:1509-1517.

Cox, G., Zamb, T., and Babiuk, L.A. 1993. Bovine herpesvirus-1: immune responses in mice and cattle injected with plasmid DNA. J. Virol. 67:5664-5667.

Frey, J. Bosse, J.T., Chang, Y-F., Cullen, J.M., Fenwick, B., Gerlach, G-F., Gygi, D., Haesebrouck, F., Inzana, T.J., Jansen, R., Kamp, E.M., Macdonald, J., MacInnes, J.I., Mittal, K.R., Nicolet, J., Rycroft, A., Segers, R.P.A.M., Smits, M.A., Stenbaek, E., Struck, D.K., van den Bosch, J.F., Willson, P.J., and Young, R. 1993. *Actinobacillus pleuropneumoniae* RTX-toxins: uniform designation of haemolysins, cytolysins, pleurotoxin and their genes. J. Gen. Microbiol. 139:1723-1728.

Gerlach, G-F., Anderson, C., Klashinsky, S., Rossi-Campos, A., Potter, A.A. and P.J. Willson. 1993. Molecular characterization of a protective outer membrane lipoprotein (OmlA) from *Actinobacillus pleuropneumoniae* serotype 1. Infect. and Immun. 61:565-572.

Huemer, H.P., Larcher, C., van Drunen Littel-van den Hurk, S., and Babiuk, L.A. 1993. Species-specific interaction of herpesviridae with the host immune system. Arch. Virol. 130:353-364.

Kowalski, J.K., Gilbert, S.A., van Drunen Littel-van den Hurk, S., van den Hurk, J.V., Babiuk, L.A., and Zamb, T.J. 1993. Heat-shock promoter-driven synthesis of secreted bovine herpesvirus glycoproteins in transfected cells. Vaccine 11:1100-1107.

Liang, X., Tang, M., Manns, B., Babiuk, L.A., and Zamb, T.J. 1993. Identification and deletion mutagenesis of the bovine herpesvirus-1 dUTPase gene and a gene homologous to herpes simplex virus UL49.5. Virology. 195:42-50.

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Van Donkersgoed, J., Ribble, C., Boyer, L., and Townsend, H. 1993. Epidemiological study of enzootic pneumonia in dairy calves in Saskatchewan. Can. J. Vet. Res. 57:247-254.

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Babiuk, L.A., Redmond, M.J., Sabara, M.I., Frenchick, P., and Laarveld, B. 1992. Immunological carriers in vaccine development. International Recombinant and Synthetic Vaccine Meeting. New Delhi, India. December.

Babiuk, L.A. 1993. Bovine herpesvirus subunit and live vectored vaccines. Joint Meeting of the Canadian Society of Microbiologists and the Society for Industrial Microbiology. Toronto. June.

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Harland, R.J. 1993. Eye of the needle – Immunization for the prevention of BRD, Current concepts and questions. Canadian Veterinary Medical Association 45th Annual Conference. Edmonton, Alberta. July.

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Potter, A.A. 1992. BRD vaccines. Canadian Society for Microbiology Western Meeting. Calgary, Alberta. October.

Redmond, M.J., Ijaz, K., Parker, M.D., Sabara, M.I., and Babiuk, L.A. 1992. Assembly of recombinant rotavirus proteins into virus-like particles and assessment of vaccine potential. World Health Organization Meeting on Enteric Diseases. Cambridge, United Kingdom. April.

Redmond, M.J., Campos, M., Matte, G., Haines, D., and Babiuk, L.A. 1993. Encapsulation and delivery of cytokines encapsulated within viral particles. Canadian Society of Immunology Spring '93 Meeting. Lake Louise, Alberta. March.

Rioux, C.R., Rawlyk, N.A., Theisen, M., and Potter, A.A. 1993. Cloning, characterization, and overexpression of *lppC*, a gene encoding an antigenic 60kilodalton lipoprotein of *Haemophilus somnus*. 93rd General Meeting of the American Society for Microbiology. Atlanta, Georgia, U.S.A. May.

Tikoo, S.K., Popowych, Y., Campos, M., and Babiuk, L.A. 1993. Antigenic and structural properties of bovine herpesvirus-1 glycoprotein gIV as defined by analysis of truncations and deletions expressed by recombinant vaccinia virus. IX International Congress of Virology. Glasgow, Scotland. August.

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Van Donkersgoed, J., van Drunen Littel-van den Hurk, S., Harland, R.J., Kowalski, J., van den Hurk, J.V., Aitchison, B., Potter, A.A., Babiuk, L.A., and Zamb, T.J. 1993. Effectiveness of a subunit BHV-1 vaccine against experimentally induced IBR. 45th Annual Convention of the Canadian Veterinary Medical Association. Edmonton, Alberta. July.

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Yoo, D., Graham, F.L., Baca-Estrada, M., Liang, X., and Babiuk, L.A. 1993. Recombinant adenovirus as a live antigen delivery vehicle for induction of mucosal immunity. Joint Conference of the Molecular Biology and Biochemistry Societies of Korea. Seoul, Korea. May.

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Hodgman, P.J. 1993. Dairy cattle research. Manitoba Milk Producers' Marketing Board. Winnipeg, Manitoba. December.

Hodgman, P.J. 1993. Overview of VIDO. Veterinary Services Laboratory Staff. Saskatchewan Agriculture and Food. Regina, Saskatchewan. January.

Hodgman, P.J. 1993. Advanced technology and its impact on animal health research at VIDO. Awareness Science and Technology Education Program. Saskatoon, Saskatchewan. March.

Hodgman, P.J. 1993. Beef cattle research. B.C. Cattlemen's Association Annual Meeting. Williams Lake, British Columbia. May.

Hodgman, P.J. 1993. Mastitis and dairy research. Alberta Milk Producers' Society Annual Meeting. Calgary, Alberta. June.

Hodgman, P.J. and Babiuk, L.A. 1993. VIDO research overview. Animal Industry Division Staff. Alberta Agriculture. Edmonton, Alberta. September.

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Van Donkersgoed, J. 1993. Does mass medication prevent BRD? Cattlemen magazine. September

Van Donkersgoed, J. 1993. Management of calf scours. Beef Cattle Producers. Swift Current and Assiniboia, Saskatchewan. February.

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Campos, M., and Babiuk, L.A. 1992. Respiratory vaccines for farm animals. In: *Veterinary Vaccines*. pp. 83-115. Ed: A.R. Peters. Butterworth, U.K.

Potter, A.A., and Babiuk, L.A. 1992. Conventional and biotechnologically engineered bovine vaccines. In: *Progress in Vaccinology*. Vol 4, pp. 240-287. Eds: R. Pandey, S. Höglund, and G. Prasad. Springer-Verlag New York Inc.

Research Collaborators

Dr. W.A. Aitchison. BIOSTAR Inc. Saskatoon, Saskatchewan.

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Dr. R. Duncan. Animal Disease Research Institute. Agriculture Canada. Nepean, Ontario.

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Dr. G.W. Wertz. University of Alabama. Birmingham, Alabama, U.S.A.

University of Saskatchewan

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- Dr. J. Ellis. Department of Veterinary Microbiology, Western College of Veterinary Medicine.

- Dr. E. Janzen. Department of Herd Medicine and Theriogenology, Western College of Veterinary Medicine.

- Dr. C. Ribble. Department of Herd Medicine and Theriogenology, Western College of Veterinary Medicine

- Dr. F. Schumann. Department of Herd Medicine and Theriogenology, Western College of Veterinary Medicine.

- Dr. L.F. Taylor. Department of Herd Medicine and Theriogenology, Western College of Veterinary Medicine.

- Dr. H. Townsend. Department of Veterinary Internal Medicine, Western College of Veterinary Medicine.

Growth and Reproductive Immunology Program at the University of Saskatchewan

A multidisciplinary group of investigators from VIDO, WCVM, and the Colleges of Medicine and Agriculture with the mandate of improving livestock production through the immunoregulation of hormone activity.

- Dr. G. Adams. Department of Veterinary Anatomy, Western College of Veterinary Medicine.

- Dr. B. Laarveld. Department of Animal and Poultry Science, College of Agriculture.

- Dr. J. Manns. BIOSTAR Inc. Saskatoon, Saskatchewan.

- Dr. R. Mapletoft. Department of Herd Medicine and Theriogenology, Western College of Veterinary Medicine.

Canadian Bacterial Diseases Network Personnel - at various centres throughout Canada

- A network of over 50 investigators from seven Canadian universities, a number of industrial companies, and government laboratories interested in bacterial diseases of humans, animals, and fish.

VIDO Financial Supporters

The following groups and agencies contributed funds to VIDO over the course of the past fiscal year through donations, grants, or contracts. Their support is acknowledged and greatly appreciated.

Agriculture Canada

Alberta Agricultural Research Institute
- Matching Grants Program
- Farming for the Future Program

Alberta Cattle Commission

Alberta Pork Producers Development Corporation

American Cyanamid Company

BIOSTAR Inc.

British Columbia Cattlemen's Association

British Columbia Hog Marketing Commission

Canada Bacterial Diseases Network

Canadian Association of Animal Breeders

Canadian Turkey Marketing Agency

Kamloops Stockmen's Association

Manitoba Pork est.

Max Bell Foundation

Medical Research Council Fellowship

National Agricultural Biotechnology Institute - Department of Western Economic Diversification

Natural Sciences and Engineering Research Council of Canada (NSERC)

Nechako Regional Cattlemen's Association

Ontario Cattlemen's Association

Province of British Columbia - B.C. Ministry of Agriculture and Fisheries

Province of Manitoba - Manitoba Department of Agriculture

Province of Ontario - Ontario Ministry of Agriculture and Food and Agriculture Research Institute of Ontario

Saskatchewan Agriculture and Food - Agricultural Development Fund

Saskatchewan Cattle Marketing Deductions Fund

Saskatchewan Health Research Board

Saskatchewan Horned Cattle Trust Fund

Saskatchewan Pork International Marketing Group

Saskatchewan Wheat Pool

Swine Improvement Services Co-operative (SISCO)

The W. Garfield Weston Foundation

Research Awards

Dr. Lorne A. Babiuk, Director of VIDO and Professor of the Department of Veterinary Microbiology in the Western College of Veterinary Medicine received two prestigious awards during this past year: (i) the American Association of Veterinary Immunologist's Award and (ii) the Xerox Canada – Forum Award.

The American Association of Veterinary Immunologists was founded in 1979 and is dedicated to the development, promotion, and dissemination of knowledge in the area of immunology of animals. To recognize extraordinary contributions in this field, the Association awards an annual prize to the individual deemed worthy of such an honour at the Conference of Research Workers on Animal Diseases in Chicago. Dr. Babiuk is the first Canadian to be the recipient of the American Association of Veterinary Immunologist's Award.

The Xerox Canada – Forum Award was established to recognize outstanding contributions to research collaborations between Universities and Industry in Canada. Part of this year's award citation is as follows:

Lorne Allan Babiuk is an outstanding Canadian researcher. As a full Professor of Veterinary Microbiology he holds the NSERC/BIOSTAR Chair in biotechnology at the University of Saskatchewan. In addition to his lecturing activities, he is currently preparing 11 graduate students, has co-authored 300 refereed scientific articles, guest lectures extensively outside his University and is a consultant to several biotechnology firms. However, it is his role as an exceptional facilitator of corporate-university collaboration that qualifies him for the Xerox Canada – Forum Award. Dr. Babiuk was amongst the first to identify the value of biotechnology in animal health. His vision is to provide useful products for end users and society. As Associate Director (Research) from 1984 at the Veterinary Infectious Disease Organization (VIDO), a financially self-reliant research and development facility owned by the University of Saskatchewan, he has occupied a key role in its development. He has been instrumental in forming one of the largest and most diversified teams of biotechnologists dealing with animal health products, resulting to date in seven commercial patents and over 20 patents pending.

Dr. Babiuk has been particularly involved in the successful transfer of these research discoveries to commercial production of effective products for the livestock industry. By his constant desire to turn science into useful application and his great skill in facilitating University-Industry research collaboration in veterinary medicine, Dr. Babiuk is the most worthy recipient of the 1993 Xerox Forum Award.

The Board of Directors, Management, and Staff of VIDO extend congratulations to Lorne on the receipt of these prestigious awards.

Lorne Babiuk