

About RI Technologies

RI Technologies is a premier source of market research on the Biotechnology & Healthcare sector. We emphasize on factual insights and forecasts with maximum global coverage. RI Technologies is constantly monitoring the biotechnology & Healthcare industry, tracking market trends, and forecasting industry based on specialized analysis. The life sciences sector is an ever growing marketplace with emerging technologies in areas of discovery, design and development.

Research – As Good as the Methodology is!

- Gauging Competitive Intelligence
- Identifying Key Growth Areas and Opportunities
- Understanding Geographic Relevance to Product
- Knowing Regional Market Sizes and Growth Opportunities and Restraints
- Keeping Tab on Emerging Technologies
- Equity Analysis
- Tapping New Markets

© COPYRIGHT

The copyright and publication rights to all RI Technologies' reports and other products are the property of the company. Plagiarism of any kind accounts to violation of copyright laws. Any type of reproduction of the material without express permission is not allowed. The buyer, under no circumstances, shall license, resell or repackage, or sell data without prior permission of the company.

DISCLAIMER

RI Technologies sells content in good faith. The company is not liable to the buyer for any implications arising out of the usage of data for any particular purpose. The company makes no representations or warranties for the accuracy or completeness of the data. While extreme caution and effort is practiced for data compilation and presentation, the company does not accept any responsibility for findings in the study which are a cumulative effort of primary and secondary research resources. The studies do not endorse or promote any product or company. RI Technologies, its affiliates, partners, distributors, and contractors are not liable for inaccuracies or incompleteness of the reports. User discretion is recommended for the usage of the data.

II. REPORT SYNOPSIS

INTRODUCTION

Immunology

Immunology is a broad branch of biomedical science that covers the study of all aspects of the immune system in all organisms. It deals with the physical, chemical and physiological characteristics of the components of the immune system in vitro, in situ, and in vivo.

It has been proved that the infection occurs in the body only if the immune system is weak. Many infectious diseases affect the human body because of immune system disorders. So, Immunology plays a vital role in treating of harmful diseases and reducing the weakness of humans or animals.

Immunology helps

- in diagnosis of the disease
- as a major criterion in identifying the abnormal changes that take place in vivo

Immunity

Immunity is a biological state wherein the body has the ability to withstand and fight against bodily disorders or the invasion of foreign bodies that may harm the body. The immune system may be both specific and nonspecific. Specific immunity is one that immunizes the body against specific disorders that may from time to time affect the body. Specific immune components adopt themselves in such a way as to create pathogens that are equipped to fight against the specific medical condition. Nonspecific immunity is one that always keeps the body on alert against any unwarranted or unexpected disorder or foreign body invasion.

Vaccine

In general a vaccine can be defined as an immunity booster or an injection administered to offer resistance to certain types of specific diseases. The term vaccine comes from the Latin word "vacca" which means cow. This term is an extract from the word cowpox first used by Edward Jenner.

Segmentation of Veterinary Vaccines

Exhibit: Segmentation of Global Veterinary Vaccines by Type (Live Attenuated, Inactivated, Recombinant and Other) and by Species (Bovine, Porcine, Poultry, Canine & Feline, Ovine & Caprine and Other)

By Type	By Species
➤ Live Attenuated	➤ Bovine
➤ Inactivated	➤ Porcine
➤ Recombinant	➤ Poultry
➤ Other ¹	➤ Canine & Feline
	➤ Ovine & Caprine
	➤ Other ²

1. Includes Conjugate Vaccines, DNA Vaccines, Toxoids.

2. Includes Equines, Wild Animals, Fish and Other Pets.

© RIT, 2010

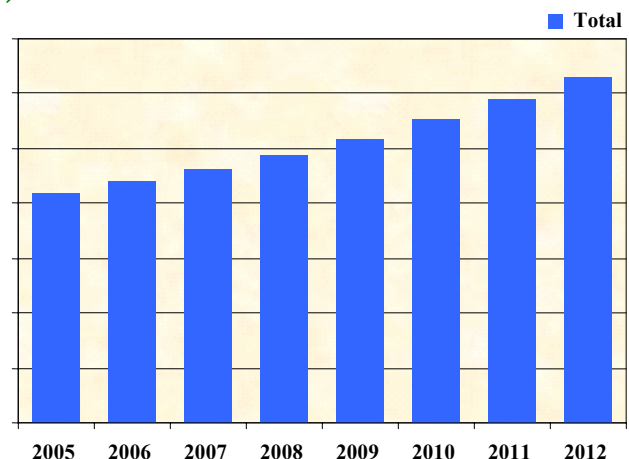
GLOBAL MARKET ANALYSIS

Global Market for Veterinary Vaccines was estimated at US\$ XXXX billion in 2006. Global Veterinary Vaccines market is projected to reach US\$ XXXX billion by 2012 growing at a CAGR of XXXX % during the analysis period (2005-2012).

Exhibit: Global Veterinary Vaccines (2005-2012) – Global Market Analysis (Current & Future) in US\$ Million

Year	Market
2005	XXXX
2006	XXXX
2007	XXXX
2008	XXXX
2009	XXXX
2010	XXXX
2011	XXXX
2012	XXXX
%CAGR	XXXX

© RIT Figures (Current & Future), 2010



III. PRODUCT TECHNOLOGY/RESEARCH

Veterinary Vaccines Growth Trends – Global Markets

In the global market for Veterinary Vaccines, Asia-Pacific is projected to be the fastest growing region with an annually compounded growth rate of **XXX** % during the analysis period. Latin America is the second fastest growing region with a CAGR of **XXX**%. Europe, North America and Rest of World have a growth rate lesser than the global average.

Exhibit: Global Market for Veterinary Vaccines: Geographic Regions (Asia-Pacific, Latin America, Middle East, Europe, North America and Rest of World) Ranked by Projected CAGR for 2005 through 2012

Region	%CAGR
Asia-Pacific	XXX
Latin America	XXX
Middle East	XXX
Europe	XXX
North America	XXX
Rest of World	XXX
Total (Global)	XXX

© RIT Figures (Current & Future), 2010

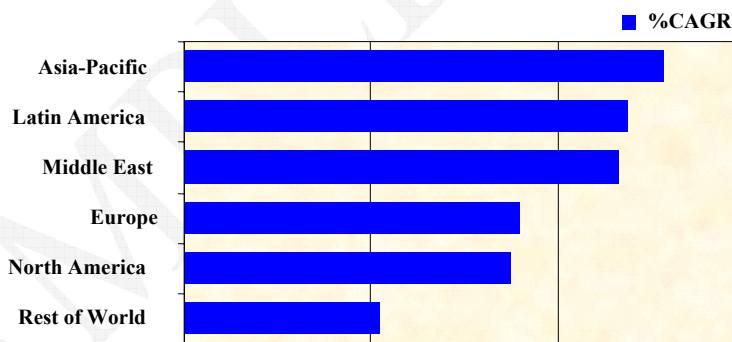


Exhibit: Animal, Disease, Causative Agent, Name of Vaccine and Type of Vaccine

Animal	Disease	Causative Agent	Name of Vaccine	Type of Vaccine
Cattle and Buffalo	Haemorrhagic Septicaemia	<i>P. multocida</i> Type B:2	Haemorrhagic Septicaemia Double Adjuvant Vaccine	Killed Vaccine
Cattle and Buffalo	Haemorrhagic Septicaemia	<i>P. multocida</i> Type B:2	Haemorrhagic Septicaemia Alum Precipitated Vaccine	Killed Vaccine
Cattle and Buffalo	Salmonellosis	<i>S. dublin</i> and <i>S. typhimurium</i>	Salmonella Double Adjuvant Vaccine	Killed Oil Adjuvant Vaccine
Ducks	Pasteurellosis	<i>P. multocida</i> and <i>R. anatipestifer</i>	Duck Pasteurellosis Alum Precipitate Vaccine	Killed Vaccine
Chicken	Fowl Cholera	<i>P. multocida</i> Type A	Fowl Cholera Alum Precipitated Vaccine	Alum Precipitated Vaccine
Chicken	Infectious coryza	<i>H. paragallinarum</i> Types A and C	Alum Precipitate Inactivated Infectious Coryza Vaccine	Alum Precipitated Inactivated Vaccine
Chicken	Newcastle Disease or Pseudo-fowl Pest	Newcastle Disease Virus	Newcastle Disease Vaccine (Modified Live Virus Vaccine, Strain A)	Freeze Dried Live Virus Vaccine
Chicken	Newcastle Disease	Newcastle Disease Virus	Newcastle Disease Vaccine (Modified Live Virus Vaccine, Strain M)	Freeze-Dried Vaccine Live Virus Vaccine
Chicken	Fowl pox	Avipoxvirus.	Fowl Pox Vaccine (Live Virus Vaccine Beaudette Strain)	Lyophilised Live Vaccine
Broilers and Layers	Infectious Bronchitis	Coronavirus	Infectious Bronchitis (Uremic) Vaccine, (Modified Live Virus, Malaysian strain)	Live Virus Vaccine
Chicks	Infectious Bursal Disease	Infectious Bursal Disease Virus	Infectious Bursal Disease Vaccine (Modified Live Virus, Malaysian strain)	Live Lyophilised Intermediate IBD Vaccine
Ducks	Duck Virus Enteritis (DVE) or Duck Plague	Duck Herpes Virus 1	Duck Virus Enteritis Vaccine (Modified Live Virus, Malaysian strain)	Lyophilised Live Attenuated
Sheep and Goats	Pasteurellosis	<i>P. multocida</i> and <i>P. haemolytica</i>	Sheep / Goat Pasteurellosis Alum Precipitate Vaccine	Alum Precipitated Killed Vaccine

© RIT, 2010

IV. MARKET DYNAMICS

MARKET TRENDS

Application of genomics and proteomics plays an important role in vaccinology and has resulted in developing new vaccines and also improving the efficiency of present vaccines. Subunit vaccines, recombinant vaccines, DNA vaccines and vectored vaccines are rapidly gaining scientific and public acceptance as the new generation of vaccines and are considered as alternatives to current conventional vaccines.

Almost 2000 of the licensed vaccines in the US are killed or live attenuated bacteria or viruses. Development in molecular biology, immunology and genetics has enhanced the production of safer and more effective vaccines.

It is also pivotal to formulate and deliver these vaccines appropriately to maximize its potential in pathogenesis and vaccinology.

Research and Selective Breeding

Immunological research in animal species and means of stimulation of immunity should be intensified greatly. This is made easier with the access to genome sequences of major species such as cattle, dogs, pigs etc. Research on adjuvants which are cable of stimulating innate immunity is also of major importance.

The methods of vaccine administration are an important aspect in veterinary vaccinology, especially in the case of vaccines for wild and domestic animals. These animals are not only hosts to identified diseases, but also for potential diseases that have not been identified yet. Certain vaccines are meant only for the preservation of endangered species.

Guidelines for Small-Animal Vaccines

In January, 2008 the (World Small Animal Veterinary Association (WSAVA) laid down some guidelines whose main principal is to ensure that each and every animal in the world is vaccinated so that the frequency of vaccination of human beings is reduced. The organization strives at the bare minimum to ensure the vaccination of dogs and cats. The reason for giving top priority to dogs and cats is that these are domestic animals that come into touch with human beings most often. The vaccination of these animals would prevent the spread of infectious diseases and would optimize the immunity against such diseases.

The basic vaccinations recommended by WSAVA are canine adenovirus (CAV), canine parvovirus (CPV), canine distemper virus (CDV), feline calicivirus (FCV), feline herpesvirus (FHV), and feline parvovirus (FPV). Apart from these there are other medications that are suggested by the organization based on the local requirements. WSAVA also recommends for an annual checkup of the animals.

Plant-Based Vaccines

The United States Department of Agriculture (USDA) announced the first global regulatory sanction for generation of vaccines from plants. Dow AgroSciences was the benefactor of this sanction. The company aims to bring viruses such as the WNV and avian influenza into its screen by 2010. Apart from these it might also cover bovine pneumonia and canine diabetes.

The advantage of this technology in comparison to other technologies is that plant proteins are much stable and can be preserved much more easily. Further, environmental risk factors arising out of contamination are largely minimized since no animal components are used. In traditional technologies it is always very important to be on the lookout for animal diseases like bovine spongiform encephalopathy.

The plant-based vaccine technology works by making plants the production centers of the requisite proteins to develop the vaccines. Thus, these plants become the veritable storehouses for vaccine antigens that include bacteria, viruses and parasites. Another great benefit of the technology is its cost-effectiveness as not much cost is involved in the raising of plants. However, scientists have to keep a watchful eye to allergies to these vaccines.

The availability of vaccines in immersion, injection and oral forms now offers a wide range of options to suit production systems, the priority being effectiveness and safety of new solutions and their economic value.

Biotechnology is technology based on biology, especially when used in agriculture, food science, and medicine. Immunotechnology is an important arm of biotechnology, constituting the industrial scale application of immunological procedures to produce vaccines, for mass immunisation to prevent prevalent diseases and/or producing immunological therapeutic agents to cure the afflicted. Chick embryos are designed specifically for production of vaccines.

DNA Vaccines

'The vaccine revolution' known as 'DNA vaccines' is used in protecting disease causing infection. This technique involves inserting of a specific part of pathogen DNA into a living host. The host produces cells that have the ability to make proteins produced by invading pathogens leading to response against the infection. Further advancements include genetic engineering applications to produce edible vaccines. For creating edible vaccines, the genetic material of a plant is changed that helps in synthesizing e.g. Fruit. This is useful for countries lacking storage facilities or staff to administer vaccines to its people.

Vaccines with Individual Antigens are Purer

Progression and Cause of veterinary diseases and bacterial components identified can be used as antigens which stimulate the immune response to protect the animals against relevant disease. Vaccines with individual antigens are purer than the existing vaccines (which are killed whole cell bacteria or cultured supernatants containing mixture of chemically inactivated toxins) as they generate an effective and more focused immune response.

GLOBAL MARKET ANALYSIS

Analysis by Type

Global Market for Live Attenuated, Veterinary Vaccines is the largest type with an estimated value of US\$XXX billion in 2006 and is projected to reach US\$XXX billion by 2012 growing at a CAGR of XXX%. Recombinant Vaccine is the fastest growing type with a CAGR of XXX% during the period 2005-2012.

Exhibit: Veterinary Vaccines (2005-2012) -Global Market Analysis (Current & Future) by Type for Live Attenuated, Inactivated, Recombinant and Other in US\$ Million

Year/Type	Live Attenuated	Inactivated	Recombinant	Other	Total
2005	XXX	XXX	XXX	XXX	XXX
2006	XXX	XXX	XXX	XXX	XXX
2007	XXX	XXX	XXX	XXX	XXX
2008	XXX	XXX	XXX	XXX	XXX
2009	XXX	XXX	XXX	XXX	XXX
2010	XXX	XXX	XXX	XXX	XXX
2011	XXX	XXX	XXX	XXX	XXX
2012	XXX	XXX	XXX	XXX	XXX
%CAGR	XXX	XXX	XXX	XXX	XXX

© RIT Figures (Current & Future), 2010

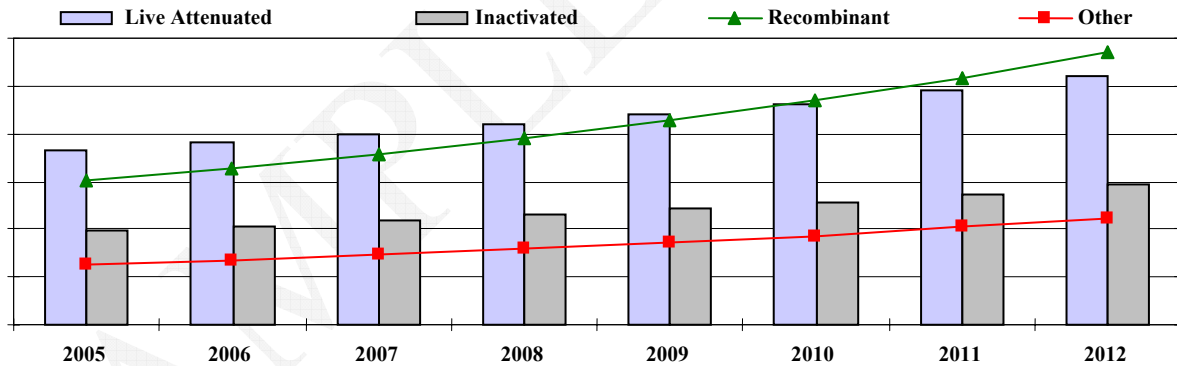


Exhibit: Veterinary Vaccines (2006, 2009 and 2012) – Percentage Breakdown of Global Market Value by Type for Live Attenuated, Inactivated, Recombinant and Other

Year/Type	Live Attenuated	Inactivated	Recombinant	Other	Total
2006	XXX	XXX	XXX	XXX	XXX
2009	XXX	XXX	XXX	XXX	XXX
2012	XXX	XXX	XXX	XXX	XXX

© RIT Figures (Current & Future), 2010