RESEARCH & DEVELOPMENT

Zoetis is focused on continuously innovating to develop animal health solutions that meet the needs of those who raise and care for animals. Research and Development (R&D) is at the core of our efforts to provide innovation outcomes that anticipate the future needs of veterinarians and livestock producers in their local markets around the globe.

R&D

Our rich R&D efforts are comprised of more than 300 programs and reflect our commitment to better solutions. We create new insights to better predict, prevent, detect and treat disease and to maximize healthy performance and production. Our R&D delivers new platforms of knowledge that can become the basis for continuous innovation. Internal discoveries, coupled with external research collaborations, result in the delivery of novel vaccine, pharmaceutical or biopharmaceutical products to help our customers face their toughest challenges. Our rigorous portfolio management approach to opportunity identification, selection and funding ensures we deliver the best solutions with speed, flexibility and efficiency.

Our commitment to continuous innovation means we actively work to broaden the reach of our existing products by developing claims for additional species, more convenient formulations and combinations, and by expanding usage into more countries. We also create opportunities to use our capabilities in diagnostics and genetics research, so we can help our customers predict and detect a variety of conditions.

GLOBAL RESEARCH NETWORK

In addition to our global R&D headquarters in Kalamazoo, Michigan, the Zoetis research network includes R&D teams throughout the United States (Nebraska and North Carolina), Europe (Belgium, Denmark, Norway and Spain), Australia, and in key emerging markets (Brazil, China, India, and Vietnam).

This worldwide network allows us to listen to livestock producers and veterinarians, region by region, and translate their challenges into practical and cost-effective products tailored to meet their needs. Our regional footprint is at the core of our ability to respond rapidly when emerging infectious diseases spread and threaten the lives of animals.

GLOBAL MANUFACTURING NETWORK

Many of our R&D operations are co-located with manufacturing sites. This allows us to bring R&D projects to commercial-scale production more efficiently and helps us bring new and enhanced products to market faster. Each of our facilities is designed to meet prevailing regulatory requirements and we work closely with key regulators in the countries where we operate to ensure that we follow their guidelines and regulations.

INNOVATION OUTCOMES

As the needs of veterinarians, companion animal owners and livestock producers around the world continue to evolve, Zoetis strives to anticipate their challenges and develop new solutions that can help them care for animals more effectively and run their businesses more productively. Our research has resulted in a broad range of products over the years that have helped veterinarians provide better care for livestock and companion animals, and livestock producers enhance the efficiency and profitability of their operations. Examples of Zoetis innovations include:

- **Alpha Ject** — An innovative family of vaccines from PHARMAQ to help prevent diseases such as furunculosis and vibriosis in farmed salmon.

- **Alpha Max** — An antiparasitic to treat sea lice in farmed salmon.

- **Apoquel** (oclacitinib tablet) — A novel Janus kinase inhibitor for the control of pruritus, or itching, associated with allergic dermatitis and the control of atopic dermatitis in dogs at least 12 months of age.
**RESEARCH & DEVELOPMENT**

- **Bovi-Shield Gold One Shot®** — A vaccine that helps protect cattle for at least 279 days against respiratory diseases caused by infectious bovine rhinotracheitis (IBR) virus and bovine viral diarrhea (BVD) virus types 1 and 2.

- **Cerexa® (maropitant citrate)** — The first and only product on the market approved to prevent vomiting due to motion sickness in dogs. Also approved for the prevention and treatment of acute vomiting in dogs 2 months and older and the treatment of vomiting in cats 4 months and older.

- **Clarifide® Plus** — The first commercially available genomic test in the U.S. that gives dairy producers the ability to predict wellness traits that directly indicate genetic risk factors for six of the most common and costly animal health challenges in Holstein cattle as well as traits indicative of productivity, allowing dairy producers to efficiently select and manage their herd.

- **Convenia® (cefovecin sodium)** — The first antimicrobial for the treatment of common bacterial skin infections in cats and dogs that provides an assured course of treatment in a single injection.

- **Cytopoint™** — The first monoclonal antibody therapy licensed to help provide sustained control of the clinical signs associated with atopic dermatitis in dogs.

- **Draxxin® (tulathromycin)** — A novel antimicrobial for livestock that delivers a full course of antibiotic therapy against bovine and swine respiratory disease in a single dose.

- **Equivac® HeV, Hendra** — A vaccine to help prevent clinical disease in horses caused by Hendra virus, a serious zoonotic disease that can be fatal to horses. (Available in Australia)

- **Fostera® Gold PCV MH** — The first vaccine to provide swine herds with protection against the two genotypes of porcine circovirus type 2 (PCV2) — 2a and 2b — and cross protection against the leading 2d genotype as well as 23 weeks of immunity for PCV and Mycoplasma hyopneumoniae (M. hyo) — the longest PCV duration of immunity for commercial PCV2 combination vaccines.

- **Improvest®/Improvac®/Vivax®/Innouse®** — A first-of-its-kind immunological that controls boar taint (an off odor and taste in cooked pork from male pigs), enabling the benefits of natural boar growth with less feed and environmental impacts while improving pig welfare.

- **Inforce™ 3** — The first and only intranasal vaccine that prevents respiratory disease caused by Bovine Respiratory Syncytial Virus while also aiding in the prevention of Infectious Bovine Rhinotracheitis and Parainfluenza Virus 3.

- **Palladia® (toceranib phosphate)** — The first drug to be approved by the FDA for treating recurrent mast cell tumors in dogs.

- **Poulvac® E. coli** — A vaccine that aids in the prevention of disease caused by E. coli in chickens and turkeys.

- **Simparica® (sarolaner) Chewables** — A monthly chewable tablet for dogs 6 months of age and older to control fleas and five species of ticks.

- **Stronghold® Plus (selamectin/sarolaner)** — A topical combination of parasitcides that treats ticks, fleas, ear mites, lice and gastrointestinal nematodes and prevents heartworm disease in cats. (Not approved for use in the United States)

- **Troxcell®** — An innovative anti-inflammatory administered monthly to dogs with degenerative joint disease. (Not approved for use in the United States)

- **Vanguard® vaccine line** — A market-leading vaccine line for dogs intended to help prevent a range of diseases. In recent years, Zoetis has added new and innovative enhancements to the line with Vanguard crLYme, Vanguard Rapid Resp Intranasal, Vanguard B Oral, and Vanguard CIV H3N2/H3N8.

- **Witness® diagnostics line** — A line of immunodiagnostic kits including the Witness Lepto (canine) Witness FeLV FIV Heartworm diagnostics and Serelisa® line of immunodiagnostic kits, including Serelisa PEDv for porcine epidemic diarrhea virus in pigs and Serelisa BVD which provides additional disease detection capabilities for bovine viral diarrhea virus in cattle.

**STRATEGIC PARTNERSHIPS**

Our work is fueled by insights from research facilities around the world, a global network of approximately 100 research collaborations and/or consortia with leading research institutes, biotechnology companies and universities, and the latest advances from related industries such as pharmaceuticals, biotechnology, bioinformatics and agribusiness. We also leverage advances in adjacent industries through open innovation networks and approaches. This allows us to work across functions, organizations and countries to address unmet animal health needs through collaborative research and development, product and technology licensing, supply and distribution in markets across the world.

Through our participation in these alliances, we focus on three key areas:

- Developing research collaborations and networks relevant to all major world regions
- New research models through participation in consortia with top global experts
- Identification and rapid response to emerging infectious diseases and collaborative food safety initiatives

In collaboration with our partners, we also strive to support and advance the veterinary profession by harmonizing standards of veterinary practice and livestock production.

For more information about our focus on R&D, visit www.zoetis.com.