SCIENCE SPEAKS

FOXI3 gene is involved in dental cusp formation

Scientists at the Max Planck Institute for Evolutionary Anthropology in Leipzig and the Friedrich Schiller Universität Jena studied the skulls and teeth of pedigreed hairless dogs from the collection of the Phyletisches Museum of the University of Jena. They suggested the involvement of the FOXI3 gene in the development of teeth - not only in hairless dogs, but potentially also in other mammals including humans.

Humans and dogs to have conversations within a decade as Pet translator devices developed

An Amazon-backed report claims on a study from the Northern Arizona University, which used artificial intelligence to decipher the calls of prairie dogs and found that they have "a sophisticated communication system that has all the aspects of language. The report claims that pets have words for different species of predator and can describe the colour of clothes of a human, or the coat of coyotes or dogs."

African golden wolf, a new species of wild dog, discovered

Scientists at the Smithsonian Conservation Biology Institute in Washington conducted a comprehensive genetic analysis of the African and Eurasian golden jackals & found that these populations were distinct across all the genetic markers tested- including data from whole genomes. The scientific name for the golden jackal is Canis aureus. The researchers proposed renaming those in Africa Canis anthus, or the African golden wolf. The genetic data indicated the two lineages are not even closely related, with the African population more closely related to grey wolves and coyotes.

Origin of modern dog has a single geographic origin, study reveals

By analyzing the DNA of two prehistoric dogs from Germany, an international research team at Stony Brook University in New York has determined that their genomes were the probable ancestors of modern European dogs. The finding suggests a single domestication event of modern dogs from a population of gray wolves that occurred between 20,000 and 40,000 years ago.

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A contagious dog flu is on the rise in the US

Dog flu has resurfaced in the U.S. Officials traced the start of the new outbreak to dog shows in Georgia or Florida. The H3N2 canine virus appeared in South Korea 10 years ago as an avian flu strain that later adapted to dogs. The disease is considered "highly contagious." When H3N2 appeared in the U.S. in 2015, over 1,000 dogs in Chicago got the virus.

Japanese woman dies from tick disease after cat bite

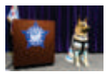
A Japanese woman died of a tick-borne disease after being bitten by a stray cat, what could be the first such mammal-to-human transmission. The woman had been helping the apparently sick cat. Ten days later she died of Severe Fever with Thrombocytopenia Syndrome (SFTS), which is usually carried by ticks. With no tick bite detected, doctors assumed the illness could have been contracted via the cat. SFTS is a relatively new infectious disease emerging in China, Korea and Japan.

Mysterious epidemic killing modern-day house cats

Feline hyperthyroidism is an increasingly common problem in cats over the age of 10, typically around 10 % are found to have the disease. While there is no known genetic predisposition for hyperthyroidism, studies link the feline disease to polybrominated diphenyl ethers (PBDEs), a common class of flame retardants that have coated the insides of our homes since decades.

Map Drawn to Predict Next Virus Jump From Mammals'

Scientists at US-based EcoHealth Alliance, with the help of a few analytical tools studied the patterns of viral diversity in wildlife and how these may successfully become the next human virus, or which viruses could cross species boundaries. They have mapped out the 'missing zoonoses' giving geographic hotspots as eastern, central and southern Africa, South and Central America as well as parts of Asia. The study has suggested that scientists could predict where on the planet the next virus could jump from animals to humans, thus providing data that will help in early warning systems and disease surveillance efforts.



Dog sculptures downtown Chicago honor police canine unit

More than 100 sculptures of German shepherds are standing guard around downtown Chicago to pay tribute to the police department's canine unit. In addition to honoring police dogs, the campaign also is a tribute to Chicago police officers who have died. The dog sculptures are sponsored by local companies or people, and have been designed by local artists.

VIVALDIS CONDUCTS A SCIENTIFIC SEMINAR ON PET OSTEOARTHRITIS

A scientific seminar on 'Diagnosis & management of osteoarthritis in pets' was conducted by Vivaldis in Lucknow recently. Dr. Milind Hatekar, one of the leading pet practitioners in Pune, was the speaker at the event. Various facets on arthritis & osteoarthritis, its etiology, symotoms, diagnosis, treatment and management were discussed. Osteoarthritis, a progressively degenerative joint disease, is a major source of pain, disability & deteriorates the quality of life in affected pets. The seminar was attended by more than 50 vets in & around Lucknow and got a magnificent response from them. During the event, three new products with distinctive composition were launched by Vivaldis- ATOPIVET- for dermatitis, recurrent dermatitis & atopic dermatitis in dogs and two products on gastrointestinal health- PROENTERIC for acute diarrhoea & digestive upset and ENTEROCHRONIC for intestinal mucosa repair in case of chronic & recurrent diarrhoea in dogs & cats.

Vaccination failure in pets may compromise their immunity against infections

Vaccination puts a tremendous burden on the immune system to mount a protective response. If the response is to be adequate and provide protection against disease, there shouldn't be any other immune-compromising stresses present. Chemotherapy and steroids suppress the immune system and deplete its ability to produce a good vaccine response.

Causes of vaccine failure in pets:

Maternal antibody

High levels of maternal antibodies present in puppy's bloodstream will block the effectiveness of vaccine.

Antibody Titer

Protection through vaccine-induced antibody titers above the protective concentration is important. A protective titer for one disease is different than that for another disease.

Damage to vaccine

UV light, long time period between reconstitution & use, improper cold chain, malhandling.

Nonadherence to vaccination schedule

Vaccine interference: If too short of a time elapses between doses of vaccines.
Prolonged interval between vaccinations.

Immunosuppression/ immunodeficiency

If pet's immune system is not functioning adequately or is suppressed, the vaccine would not initiate a proper immune response.

Concurrent disease process

Fever, certain viral infections, stress may decrease the ability of the immune system to adequately respond to vaccination.

Insufficient time between vaccination and exposure

Too short an interval between vaccination and exposure to disease can develop the disease. The same is true if time between vaccination and exposure is too long.

Different strain of bacteria or virus

A vaccine produced from one strain may not adequately protect against another strain.

Improper administration

Vaccines are developed to be given by a certain route, if not given by, it may not be effective and could cause considerable harm.

Genetics

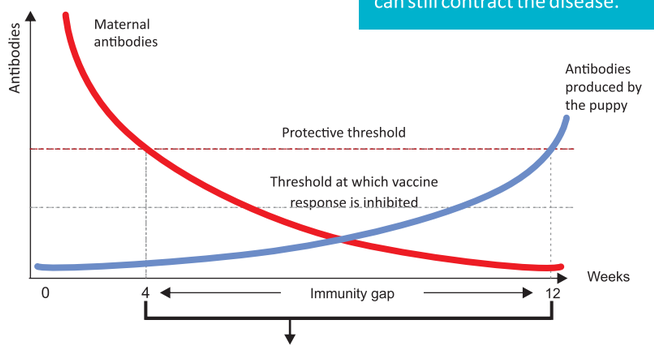
Breed susceptibility to certain diseases.

Nutritional deficiencies

Malnourished animals- Vitamin A, Vitamin E & Se deficiencies and restricted protein or calories can result in suppression of the immune system.

Window Of Susceptibility

Period of time in which the maternal antibodies are too low to provide protection against the disease but too high to allow a vaccine to work. This is the time when despite being vaccinated, a puppy can still contract the disease.



IMMUNOMODULATION DURING SUCH PERIOD OF WEAKENED IMMUNITY BECOMES ESSENTIAL FOR PETS HEALTH

IMMUNOMODULATION

Immunomodulation is focused on manipulation of immune system to control the infections and other adverse health effects with precise regulation to avoid any complications while suppressive or potentiating efforts are made to benefit the animal health.

At present chemotherapy is the most common and widely acceptable approach to control the microbial infections of veterinary and medical importance. Immunomodulation refers to the manipulation of immune system and all therapeutic interruptions targeted for modulating the immune system.[1] The augmentation of immune response, known as immunostimulation or immunopotentiation, can be utilized to prevent infection by vaccination through activation of humoral immunity, to fight against an already established infection by shifting the immune response to cell mediated type and to fight against cancer by the use of cytokines, tumour specific antibodies and tumour infiltrating lymphocytes. Immunomodulation can be either specific or non-specific. An immunomodulator is any biological or synthetic substance that can stimulate/suppress either innate or adaptive or both arms of the immune system.[2]
A potent immunomodulator have got many advantages over antimicrobials. The antimicrobials are specific in nature whereas immunomodulators provide broad spectrum capability against bacterial, viral and fungal diseases and thereby provide nonspecific emergency-therapeutic approaches in the event of emergence of a strange pathogen.[3]

Cytokines:

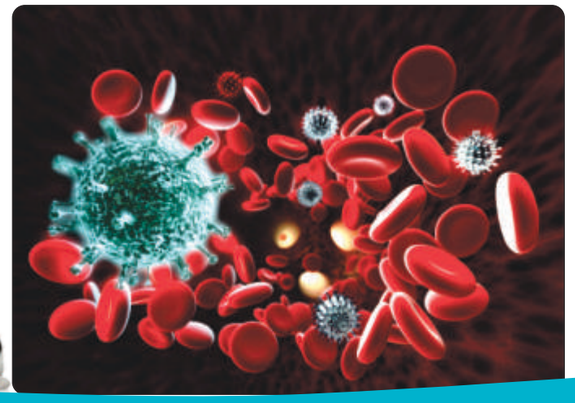
Cytokines are low molecular weight glycoproteins produced by a number of cell types, predominantly leukocytes that regulate immunity, inflammation and hematopoiesis.[4] A variety of immune cells produce them to communicate and orchestrate immune attacks.[5] There may be initiation and perpetuation of autoimmune and infectious diseases along with tumour growth due to imbalanced network or abnormal production of cytokines.[6] They are autocrine, paracrine or endocrine in action and may exert either synergistic or antagonistic effect on their own production. Cytokine secretion, when modulated, may treat a wide variety of diseases.[7]

Interferons:

The interferons are a family of cytokine mediators critically involved in alerting the cellular immune system to viral infection of host cells. Interferons not only exhibit important antiviral effects but also exert a key influence on the quality of the cellular immune responses and amplify antigen presentation to specific T cells. Type I interferon (IFN-alpha and IFN-beta) is secreted by virus-infected cells while type II, immune or gamma interferon (IFN-gamma) is mainly secreted by T cells, natural killer (NK) cells and macrophages. Interferons interact with specific cellular receptors, which promote production of second messengers ultimately leading to expression of antiviral and immune modulatory genes. IFNs activate macrophages, induce B cells to switch immunoglobulin type, alter T helper response, inhibit cell growth, promote apoptosis and induce an antiviral state in uninfected cells. Both types of IFN have profound immunomodulatory effects and stimulate the adaptive response. However, whilst both IFN-α/β and IFN-γ influence the properties of immune effector cells, they show significant differences, and it is these extended cytokine functions that probably account for the different spectrums of antiviral activities of the two types of IFN.

Table : List of important immunomodulatory cytokines:

Interferons (IFN)	Colony Stimulating Factors (CSF)	Pro-inflammatory cytokines	Anti-inflammatory cytokines
Type I (IFN α/ IFN β)	IL-3/Multi-CSF	IL-1, IL-17	IL-4
Type II (IFN-ϒ)	Macrophage CSF (M-CSF)	IL-6	IL-10
	Granulocyte CSF (G-CSF)	IL-12	TGF- β
	Granulocyte Macrophage CSF (GM-CSF)	TNF- α	



References:

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