**VMD-202**

**Name:**

**Hafiz Muhammad Faisal Ramzan**

**Section:**

**E**

**Roll No.**

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**Topic:**

**Vaccines**

**Submitted To:**

**Prof. Dr. Imtiaz sahb**

**College Of Agriculture**

**University Of Sargodha**

***Vaccine***

**Vaccine** is suspension of weakened, killed, or fragmented microorganisms or [toxins](https://www.britannica.com/science/toxin) or of [antibodies](https://www.britannica.com/science/antibody) or lymphocytesthat is administered primarily to prevent [disease](https://www.britannica.com/science/disease). A vaccine can confer active immunity against a specific harmful agent by stimulating the [immune system](https://www.britannica.com/science/immune-system) to attack the agent. Once stimulated by a vaccine, the antibody-producing cells, called [B lymphocytes](https://www.britannica.com/science/B-cell), remain sensitized and ready to respond to the agent should it ever gain entry to the body.

*The First Vaccines:*

The first vaccine was introduced by British physician Edward Jenner, who in 1796 used the cowpox virus (Vaccinia) to confer protection against [smallpox](https://www.britannica.com/science/smallpox), a related virus, in humans. Prior to that use, however, the principle of vaccination was applied by Asian physicians who gave children dried crusts from the lesions of people suffering from smallpox to protect against the disease. In 1881 French microbiologist Louis Pastuerdemonstrated immunization against anthraxby injecting sheepwith a preparation containing [attenuated](https://www.merriam-webster.com/dictionary/attenuated) forms of the bacillus that causes the disease. Four years later he developed a protective suspension against rabies.

## Vaccine Effectiveness:

After Pasteur’s time, a widespread and intensive search for new vaccines was conducted, and vaccines against both bacteriaand viruseswere produced, as well as vaccines against venoms and other toxins. Through vaccination, smallpox was [eradicated](https://www.merriam-webster.com/dictionary/eradicated) worldwide by 1980, and poliocases declined by 99 percent.

## Vaccine Types:

The challenge in vaccine development consists in devising a vaccine strong enough to ward off infection without making the individual seriously ill. To that end, researchers have devised different types of vaccines. Weakened, or [attenuated](https://www.britannica.com/science/attenuation-immunization), vaccines consist of microorganisms that have lost the ability to cause serious illness but retain the ability to stimulate immunity. They may produce a mild or subclinical form of the disease.

Attenuated vaccines include those for measles, mumps, [polio](https://www.britannica.com/science/polio) (the [Sabin vaccine](https://www.britannica.com/science/Sabin-vaccine)), [rubella](https://www.britannica.com/science/rubella), and tuberculosis. Inactivated vaccines are those that contain organisms that have been killed or inactivated with [heat](https://www.britannica.com/science/heat) or chemicals.

Inactivated vaccines elicit an immune response, but the response often is less complete than with attenuated vaccines. Vaccines against [rabies](https://www.britannica.com/science/rabies), polio (the [Salk vaccine](https://www.britannica.com/science/Salk-vaccine)), some forms of [influenza](https://www.britannica.com/science/influenza), and [cholera](https://www.britannica.com/science/cholera) are made from inactivated microorganisms.

Another type of vaccine is a subunit vaccine, which is made from [proteins](https://www.britannica.com/science/protein) found on the surface of [infectious](https://www.britannica.com/science/infectious-disease) agents. Vaccines for influenza and hepatitis B are of that type.

Vaccines against [human papillomavirus](https://www.britannica.com/science/human-papillomavirus) (HPV) are made from viruslike particles (VLPs), which are prepared via recombinant technology. The vaccines do not contain live HPV biological or genetic material and therefore are incapable of causing infection. Two types of HPV vaccines have been developed, including a bivalent HPV vaccine, made using VLPs of HPV types 16 and 18, and a tetravalent vaccine, made with VLPs of HPV types 6, 11, 16, and 18.

Another approach, called naked DNA therapy, involves injecting [DNA](https://www.britannica.com/science/DNA) that encodes a foreign protein into [muscle](https://www.britannica.com/science/muscle) cells. The cells produce the foreign antigen, which stimulates an immune response.

**Vaccination:**

The basic strategies behind the use of vaccines are to prepare the human immune system to deal with harmful pathogens. Adjuvants, such as aluminum, are incorporated into vaccines to hasten the body's immune response.

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| ***Disease*** | ***Vaccine*** | ***Time for Vaccination*** | ***Recommended dose and rate*** |
| Haemorrhagic Septicemia (HS) | HS (VRI) | May/June and November/December | 5 ml / 300 kg s/c |
| HS (NIAB) | Once a year (Before rainy season) | 5 ml I/M |
| Black Quarter | BQ | March/April | 5 ml s/c |
| Anthrax | Anthrax | August | 1 ml s/c |
| Foot & Mouth Disease (FMD) | FMD (VRI) | February/March and September/October | 5 ml  s/c |
| FMD (Marial) | At start of winter season | 3 ml (large animal) 2 ml (small animal) |

***Majorly used Vaccines and their receptor diseases***

Important reasons to vaccinate your pet

1. Vaccinations prevent many pet illnesses.
2. Vaccinations can help avoid costly treatments for diseases that can be prevented.
3. Vaccinations prevent diseases that can be passed between animals and also from animals to people.
4. Diseases prevalent in wildlife, such as rabies and distemper, can infect unvaccinated pets.
5. In many areas, local or state ordinances require certain vaccinations of household pets.



**End**

