

## Poisonous and Non-poisonous snake

### A. General characteristics of Snakes:

- Snakes are cold-blooded, limbless and carnivorous reptiles that found in both aquatic and terrestrial habitat. Terrestrial forms live in holes, burrows or canopy of trees.
- Body is long, narrow, cylindrical and flattened ventrally with or without a constriction behind the head. The head is blunt and tail is tapering.
- The body is covered by horny scales and they are removed several times in the course of the year. [This process is called ecdysis or molting.]
- The mouth of a snake is capable of being very widely opened by the free articulation of the lower jaw.
- Non-poisonous snakes have solid, elongated, sharp, pointed and curved teeth; 2 rows in upper jaw and 1 row in lower jaw. They prevent the escape of their preys.
- Poisonous snakes have long, curved, sharp, pointed and hollow maxillary teeth in upper jaw called **fangs**. They serve as hypodermic needles for injecting venom into the body of victim or preys.
- The tongue is long, narrow, forked and highly mobile. It is used as a tactile organ (organ of touch) for receiving the earth-borne vibrations.
- They are unable to hear air-borne sound due to absent of ear drum (tympanum), tympanic cavity and eustachian tube.
- Eyelids are immovable.

### B. Economic Importance of Snakes:

- The snake venom has been used for manufacturing the anti-venom and different medicines.
- Snakes help to maintain biodiversity.
- They act as predators to many animals including rodents and other snakes. They are also prey to other bigger predators like birds, mammals and other reptiles.
- Many snakes are collected for the pet trade.
- The skin of snakes is used to make different accessories like belts, shoes, caps, bags and jackets etc.
- Snakes are also used as food in many countries.
- They are also worshipped as God in Hindu culture.

### C. Difference between Poisonous and Non-Poisonous Snakes:

S.N.	Non-Poisonous Snakes	Poisonous Snakes
1.	Head is usually narrow and elongated.	Head is long, triangular and wide due to the presence of poison glands on two sides of the head.

2.	Neck is un-constricted. Hood is usually absent.	Neck is constricted. Hood is usually present.
3.	Teeth are uniform and solid. Fangs are absent.	Teeth are not uniform. The maxillary teeth are large and called 'fangs.' Fangs are grooved or with a canal.
4.	Poison glands absent.	Two poison glands are present.
5.	Scales on top of the head are large but in sand boas ( <i>Eryx conicus</i> ) the head scales are small.	Scales on top of the head are usually small.
6.	Dorsal scales are longer but spinal or vertebral scales are neither larger nor hexagonal.	Dorsal scales are smaller but spinal or vertebral scales are larger and hexagonal in kraits.
7.	Ventral scales are either across the belly completely or may not across the belly completely.	Ventral scales are usually completely across the belly, except in sea snakes; ventral scales are not across the body.
8.	Loreal shield and loreal pit are absent	Loreal shield and loreal pit are present
9.	Tail is tapering and long.	Tail tapers abruptly and cylindrical in shape but in sea snakes, the tail is flattened to form an oar-shaped
10	Examples– Indian Python ( <i>Python molurus</i> ), Sand Boa ( <i>Eryx conicus</i> ).	Examples– Common Krait ( <i>Bungarus caeruleus</i> ), Common Cobra ( <i>Naja naja</i> )

#### D. Snake bite:

The poisonous and nonpoisonous snakes can be identified on the basis of snake bite.

- The bite of poisonous snake is marked by 2 large holes or punctures of fangs with or without small marks of other teeth. Besides that, bitten part is soon swell with intense pain, blood oozes out and adjacent skin become blue or greenish and the tissue starts degenerating.
- The bite of non-poisonous snake is marked by many small holes or punctures on the skin that made by the maxillary teeth of upper jaw.

#### E. Venom:

Snake venom is a **complex mixture of enzymes and toxins**, secreted by the poison glands present in the upper jaw of venomous snakes. It is a clear, sticky, pale-yellow color, tasteless, odorless and acidic secretion. It is used to immobilize and digest the preys by the snakes. It is also used as a defensive and a survival tool. It is injected in the body of prey at the time of bite through the fangs.

#### F. Types of Venom:

Types of venom according to their effects:

**1. Neurotoxic Venom:**

It affects the nervous system and causes paralysis of muscles specially the respiratory muscles, damage to the brain, and loss of consciousness. It acts very quickly. Examples; Venom of King Cobra and Kraits.

**2. Hemotoxic Venom:**

It affects the cardiovascular system and causes hemorrhage, hemolysis, blood clotting or even prevent blood clotting and cardiovascular failure. It works slower than other types of snake venom. Examples; Rattle snakes and Russell's viper.

**3. Cytotoxic Venom:**

It kills cells and causes the severe damage the skin and underlying tissues, often leading to disabilities in the victim. Examples; cobras.

**4. Proteolytic Venom:**

It is found in all venomous snakes that causes the degradation of tissue structures, swelling and local pain etc. Large amounts of proteolytic venom are found in rattlesnakes and other pit vipers.

**G. Effects of Venom or symptoms of snake bites:**

Venom is generally introduced into the subcutaneous tissue and then reaches to the general circulation. The effect of venom of different snakes are following:

**1. Cobra bite:**

Cobra venom is a **neurotoxin**, attacking the nerve centers and causing paralysis of muscles, especially respiratory muscles. The effects of venom are observed within half an hour.

Symptoms includes;

- Piercing pain and burning sensation ending in numbness.
- Bitten part turns into the bluish or blackish.
- Giddiness, high pulse rate, speechlessness, drooping of saliva and eyelids.
- Contraction of pupil, partial paralysis of tongue and larynx, vomiting and labored breathing.
- Death results within a few hours due to failure of respiration or of heart activity.

**2. Viper bite:**

Viper venom is a **hemotoxic**, affecting circulatory and nervous system. The effects are observed within a quarter of an hour.

Symptoms;

- Swelling, discoloration and acute burning pain of the bitten part.
- High pulse rate, profuse vomiting and watery discharge from rectum.
- A red fluid oozes out from wound due to massive tissue destruction.
- Dilation of pupil, eyes lose sensitivity to light and consciousness is affected.
- Death may result due to paralysis of Vaso-motor centers and exhaustion profuse bleeding and swelling spreads.

### 3. **Krait bite:**

The krait venom is both **neurotoxin** and **hemotoxin**. Krait is dangerously poisonous snake because it bites injects a very large quantity of poison.

Symptoms

- It is very much similar to those of cobra bites, except that the victim complains of severe abdominal pain, paralysis of trunk and limbs and respiratory failure. The cause of death is asphyxia.

**H. Cure of snake bite:** The best treatment for snake bite is to inject the antivenom serum or **antivenin**

### **I. First Aid treatment of Snake bites:**

First-aid treatment includes emergency care of victim of snake bites before complete medical or surgical treatment can be secured.

1. **Psychological treatment:** The victim should first treat psychologically with reassuring and encouraging word; most are terrified and apprehensive.
2. **Torniquet:**
  - A torniquet should be immediately tied on the bitten limb above the bite by any available material such as a handkerchief, piece of cloth, rubber tube, etc. This prevents or delays circulation of poison in the body.
  - The tourniquet must not be applied very tightly and should be removed for a few minutes in between.
3. **Care of wound:**
  - Wounded part should be washed with clean water or soap and water and covered with a clean and dry dressing.
  - Application of potassium permanganate to wound should be avoided.
  - Constricting cloth or jewelry should be removed because the area surrounding the bite will likely swell.

- Slashing or cutting the wound or sucking out the venom from the wound or applying ice should be avoided.
4. **Care of person:**
- Anything causing excitement or exertion to the victim should be avoided like drinking alcoholic beverages, taking pain relievers or applying electric shock etc.
  - The victim should be allowed to lay down in comfortable and safe position. Movement can cause the venom to travel more quickly through the body
  - The victim should be immediately carried or transported to nearest hospital or qualified doctor for treatment with an antivenom.

**J. Identification key of poisonous and Non-poisonous snakes:**

S.N.	Structures	Characters	Nature	Snakes
1.	Tail	Tail laterally compressed, oar-like	Poisonous	Sea snake- <i>Hydrophis</i>
		Tail cylindrical, tapering	Poisonous or non-poisonous	Land snakes
2.	Belly scales or ventrals	Belly scales small, continuous with dorsals	Non-poisonous	
		Ventrals not fully broad to cover belly	Non-poisonous	Pythons
		Ventrals broad, fully covering belly	Further examination	
3.	Head scales, loreal pit, sub-caudals	Head scales small. Head triangular. No loreal pit	Poisonous	Pitless vipers
		Sub-caudals double	Poisonous	<i>Vipera russelli</i>
		Sub-caudals single	Poisonous	<i>Echis carianata</i>
		Head scale small. Loreal pit present between nostrils and eye.	Poisonous	Pit vipers <i>Lachesis</i> , <i>Ancistrodon</i>
		Head with large shields. No loreal pit	Examine further	
4.	Vertebrales, 4 <sup>th</sup> infra-labial, 3 <sup>rd</sup> supra-labial	Vertebrales enlarged, hexagonal, 4 <sup>th</sup> infra-labial largest	Poisonous	Krait, <i>Bungarus</i>
		Vertebral not enlarged, 3 <sup>rd</sup> supra-labial touches eye and nostril a. Neck with hood and spectacle mark b. Hood absents. Coral spots on belly	Poisonous Poisonous Poisonous	a. Cobra, <i>Naja</i> b. Coral snakes, <i>Callophis</i>

		No such characters	Non-poisonous	
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### K. Geographical distribution and characters of Poisonous Snakes of Nepal:

89 different species of snakes have been recorded in Nepal. Among them, 17 species are poisonous or venomous. They are mostly found in terai region of Nepal due to warm climate. They are following;

#### 1. Krait (*Bungarus*):

It is the most venomous snakes in Nepal. It is slender, about 1m long and has small Fangs. It is distributed in lowland and lower mountains of Nepal. There are six species of krait found in Nepal. Like;

- Himalayan Krait (*Bungarus bungaroides*)
- Common krait (*Bungarus caeruleus*) [It is **highly poisonous snake** and its venom is more poisonous than a cobra.]

#### 2. Cobra (*Naja*):

It has a small head with small and relatively immovable fangs. When annoyed, it raises the front part of the body, spreads its hood and hisses through the nose. It is more deadly than that of vipers. They are usually found in the lowlands and lower mountains of Nepal where there are grasslands, forests or in residential areas as well. There are three species of cobra in Nepal. For examples;

- Indian Cobra (*Naja naja*)
- King Cobra (*Ophiophagus hannah*) [It is the world's largest poisonous snake]
- Monocellate cobra (*Naja kaouthia*)

#### 3. Viper (*Vipera*):

Viper has thick body up to 4.3 cm long. Head is large, flat, and covered with small scales. Nostrils are lateral, eyes are far forwards and there is a sensory pit between the eye and the nostril in some. Pits are sensory organs with which the snake can detect its prey. The scales on the body are keeled. Tail is short and tapers abruptly. There are seven species of viper found in Nepal. Like;

- Himalayan pit viper (*Gloyfius himalayanus*)
- Mountain viper (*Ovophis monticola*)

#### 4. MacClelland's coral snake (*Sinomicrurus macclellandi*)

It is generally found in lowlands and lower mountains from central, western to Eastern Nepal. It is usually 50-80 cm long. Head black above with a wide white, yellow or cream-colored transverse stripe behind the eye. Back of body is reddish brown with or without a black vertebral stripe.