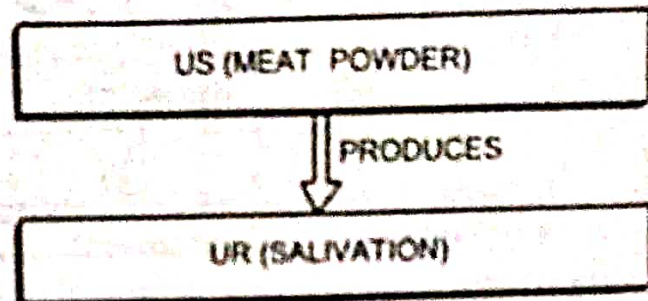
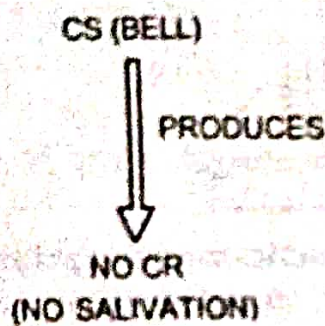


## Conditioned Reflex

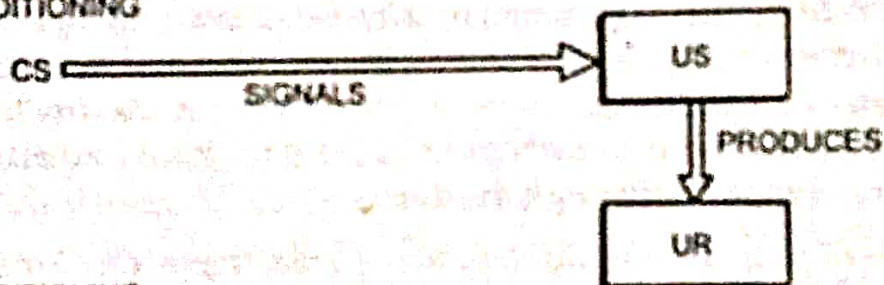
Conditioned reflex is the best example of associative learning. It is also called **classical conditioning** or **Pavlovian conditioning** after the name of Russian physiologist, **Ivan Pavlov**. A conditioned reflex is produced by a previously neutral stimulus when given along with an unconditioned stimulus.

When two different types of stimuli are given to an animal in quick succession, the first stimulus which prior to learning was neutral and did not initiate any response but after learning makes the animal to respond is called **conditioned**

BEFORE CONDITIONING



DURING CONDITIONING



AFTER CONDITIONING

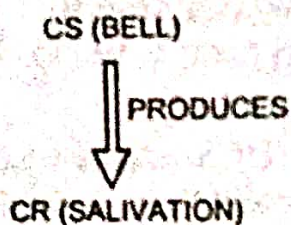


Fig. 4. Sequence of events and relationship among stimuli and response for classical conditioning.

**stimulus (CS).** The response to conditioned stimulus is called **conditioned response.** The second stimulus produces a specific response both before and after learning and the same response is exhibited by the conditioned stimulus. This is called **unconditioned stimulus (UCS)** and the response as **unconditioned response (UCR).**

An example of conditioned reflex or classical conditioning is Pavlov experiment.

### Pavlov Experiment

Pavlov conducted classical experiments with dogs involving the salivary reflexes and their association with higher centres of the brain especially the cerebral hemispheres. He placed a hungry dog on a stand as shown in the figure. Dog was taken because it produces copious amount of saliva when food is in its mouth. He did a minor operation so that one of the salivary glands led to outside of the mouth instead of inside. The saliva secreted through the duct was collected in the measuring cylinder.

The operated dog was placed on the stand with its legs encircled by loops attached to overhead bar. Now experimental training was given to the dog by presenting food (reward) along with different controlled stimuli such as light, sound or touch.

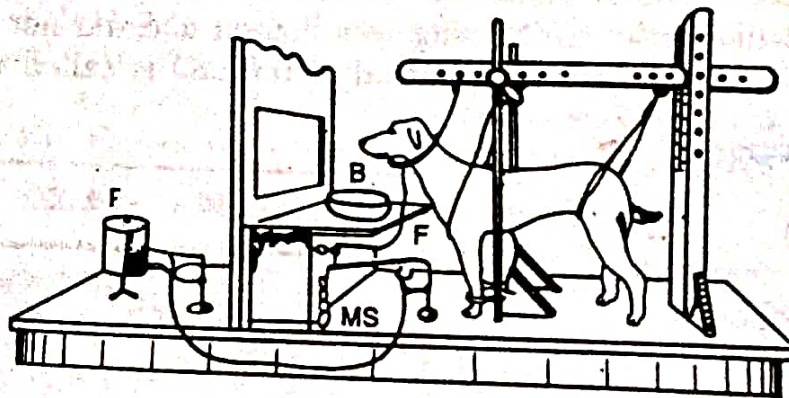


Fig. 5. Pavlov's apparatus. Pavlov discovered classical conditioning through his work on the salivary reflex in dogs. The dog is ready to be tested using the classical conditioning apparatus.

**Primary Stimulus :** It automatically produces (eating) behaviour without previous experience; e.g. a very young puppy who had no previous experience would give an immediate reaction to meat and try to eat. **Pavlov** found that showing a dog meat or allowing it to eat would cause it to drool (watering in the mouth), and the saliva comes out through the duct.

The idea of primary stimulus producing a reaction without preliminary training is an essential part of the theory of learning. The animals always give an invariable response to a primary stimulus. According to **Pavlov**, the response to a primary stimulus is called **unconditioned response (UCR).** Thus meat is **unconditioned stimulus (UCS)** or a **releaser.**

**Secondary Stimulus :** After observing that an UCS always produced salivation, **Pavlov** gave the animal a secondary stimulus which in normal course did not produce any salivation. Now he sounded a buzzer just before the meat was presented. When, he sounded the buzzer next time, the dog began to salivate before

it saw the food. After repeated trials, the tendency became stronger and stronger, and the dog drooled copiously at the sound of buzzer, even when the food was not presented.

The above experiment illustrates the principle of association in which a secondary stimulus preceding the primary stimulus becomes associated with the responses produced normally by the primary stimulus. Now the dog had learnt to respond to a new stimulus which was previously neutral. Pavlov called it the **conditioned stimulus (CS)**, and the salivation response to CS as the **conditioned response (CR)**.