CLASSIFICATION OF NERVE FIBERS

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„BASIS OF CLASSIFICATION:

Nerve fibers are classified by six different methods. The basis of classification differs in each method.

1. Depending upon structure

2. Depending upon distribution

3. Depending upon origin

4. Depending upon function

5. Depending upon secretion of neurotransmitter

6. Depending upon diameter and conduction of impulse (ErlangerGasser classification)

1. DEPENDING UPON STRUCTURE

Based on structure, nerve fibers are classified into two types:

i. *Myelinated Nerve Fibers*

Myelinated nerve fibers are the nerve fibers that are covered by **myelin sheath.**

ii. *Non-myelinated Nerve Fibers*

Nonmyelinated nerve fibers are the nerve fibers which are not covered by myelin sheath.

2. DEPENDING UPON DISTRIBUTION

Nerve fibers are classified into two types, on the basis of distribution:

i. *Somatic Nerve Fibers*

Somatic nerve fibers supply the skeletal muscles of the body.

ii. *Visceral or Autonomic Nerve Fibers*

Autonomic nerve fibers supply the various internal organs of the body.

3. DEPENDING UPON ORIGIN

On the basis of origin, nerve fibers are divided into two types:

i. *Cranial Nerve Fibers*

Nerve fibers arising from brain are called cranial nerve fibers.

ii. *Spinal Nerve Fibers*

Nerve fibers arising from spinal cord are called spinal nerve fibers.

4. DEPENDING UPON FUNCTION

Functionally, nerve fibers are classified into two types:

i. *Sensory Nerve Fibers*

Sensory nerve fibers carry sensory impulses from different parts of the body to the central nervous system. These nerve fibers are also known as **afferent nerve fibers**.

ii. *Motor Nerve Fibers*

Motor nerve fibers carry motor impulses from central nervous system to different parts of the body. These nerve fibers are also called **efferent nerve fibers**.

5. DEPENDING UPON SECRETION OF NEUROTRANSMITTER

Depending upon the neurotransmitter substance secreted, nerve fibers are divided into two types:

i. *Adrenergic Nerve Fibers*

Adrenergic nerve fibers secrete **noradrenaline.**

ii. *Cholinergic Nerve Fibers*

Cholinergic nerve fibers secrete **acetylcholine.**

6. DEPENDING UPON DIAMETER AND CONDUCTION OF IMPULSE (ERLANGER-GASSER CLASSIFICATION):

Erlanger and Gasser classified the nerve fibers into three major types, on the basis of **diameter (thickness)** of the fibers and **velocity of conduction of impulses**:

    i. Type A nerve fibers

    ii. Type B nerve fibers

    iii. Type C nerve fibers.

Among these fibers, type A nerve fibers are the thickest fibers and type C nerve fibers are the thinnest fibers. Type C fibers are also known as Type IV fibers. Except type C fibers, all the nerve fibers are myelinated.

Type A nerve fibers are divided into four types:

a. Type A alpha or Type I nerve fibers

b. Type A beta or Type II nerve fibers

c. Type A gamma nerve fibers

d. Type A delta or Type III nerve fibers.

Type	Diameter (µ)	Velocity of conduction (meter/second)
A alpha	12 to 24	70 to 120
A beta	6 to 12	30 to 70
A gamma	5 to 6	15 to 30
A delta	2 to 5	12 to 15
B	1 to 2	3 to 10
C	< 1.5	0.5 to 2