

## Beta-Blockers

Also sometimes known as **beta antagonists**, **beta-adrenergic blocking agents**, or **beta-adrenergic antagonists**.

# School of Nursing

Course Code : BSCN 2002

Course Name: PPG

- **Beta- blockers blocking the SNS activity.**
- **Known as sympatholytics.**
- **Beta- blockers block the effect of stress hormone and work by reducing the body's natural fight and flight response.**
- **Beta-blockers block the hormones **adrenaline** and **noradrenaline** in the SNS.**

## Beta 1 Receptors

**Present**  
**in heart, and increase the HR**

## Beta 3 Receptors

**Fat cells**

## Beta 2 Receptors

Lungs(bronchus)

BV

Liver

Bronchi dilation in lungs

Vasodilatation in BV

In liver reversal hypoglycemia

# School of Nursing

Course Code : BSCN 2002

Course Name: PPG

## $\beta$ Receptor Locations

$\beta_1$  = Heart (1 heart)

$\beta_2$  = Lungs (2 lungs)

Beta-blockers site of action (  
remember of **1 heart, 2  
lungs**)

Beta-1 = 1 heart

Beta-2 = 2 lungs

Adrenoceptors: vasomotor  
function of alpha vs. beta  
(remember of **AC-BD**):

Alpha = **C**onstrict.

Beta = **D**ilate.

## Classification of Beta blockers

- 1. Non- selective Beta blockers**
- 2. Cardio selective Beta blockers**
- 3. Intrinsic sympathomimetic property**
- 4. Membrane stabilizing property**

## Non- selective Beta blockers

- Also known as **first generation beta blockers.**
- They are non- selective in nature means they block the both beta 1 and beta 2 receptors.
- Contraindicated in case of **asthma, Raynaud's disease and DM**

# School of Nursing

Course Code : BSCN 2002

Course Name: PPG

## 3PNTS

- **Propranolol**
- **Pindolol**
- **Penbutalol**
- **Nadolol**
- **Timolol**
- **Sotalol**

*M*

Contra-indications of non-selective  $\beta$ -blockers

A – Asthma

B – Block (AV)

C – CHF

D – Diabetes !

## Cardio Selective Beta Blockers

- Also known as 2<sup>nd</sup> generation beta blockers.
- Cardio selective in nature.
- **Exclusively made for heart.**
- Block the B1 receptor.

# School of Nursing

Course Code : BSCN 2002

Course Name: PPG

- **New** ----- **Nebivolol**
- **Beta** ----- **Betaxolol**
- **Blockers** ----- **Bisoprolol**
- **Acting** ----- **Acebutolol**
- **Exclusively** ----- **Esmolol**
- **At** ----- **Atenolol**
- **Myo** ----- **Metoprolol**
- **Cardium** ----- **Celiprolol**

## Important to learn

- **Preferred in case of asthma, Raynaud's disease or vascular disease.**

## Intrinsic Sympathomimetic Property

- It works as a partial agonist.
- When the person is more likely to develop bradycardia.

# School of Nursing

Course Code : BSCN 2002

Course Name: PPG

- **CONtain**-----**Celiprol, Oxprenolol**
- **Partial**-----**Pindolol**
- **Agonist**-----**Alprenolol**
- **Activity**-----**Acebutolol**

## Membrane stabilizing property

- It has local anesthetic property in neuron
- **Block Na ion-----depolarization not occur**

(stabilize the membrane of heart)

- Arrhythmia-

# School of Nursing

Course Code : BSCN 2002

Course Name: PPG

- **Posses-----Propanolol**
- **Membrane stability-----Metoprolol**
- **Anesthetic-----Acebutolol**
- **Property-----Pindolol**

## Indications

- **(Remember of H&M HAT):**
- **Hypertension / Hypertension ocular (Glaucoma)**
- **Myocardial infarction /Migraine prevention**
- **Hyperthrophy obstructive cardiomyopathy**
- **Angina pectoris / Arrhythmia**
- **Thyrotoxicosis**

## Beta Blocker Indications

### MNEMONICS!

Beta blockers by indication include:

**Cardiac  
arrhythmia**

Esmolol  
Sotalol  
Acebutolol

**Migraine**

Propranolol  
Timolol

**Heart failure**

Metoprolol  
Bisoprolol  
Carvedilol

**Hypertension**

Bisoprolol  
Metoprolol  
Nebivolol  
Atenolol  
Labetalol  
Acetbutolol

**Glaucoma (TBC)**

Timolol  
Betaxolol  
Carteolol

**Heart attack (CAB)**

Carvedilol  
Atenolol  
Bisoprolol

## Contraindications

(Remember of ABCDE):

- **Asthma**
- **Block (heart block)**
- **COPD**
- **Diabetes mellitus**
- **Electrolyte (hyperkalemia)**

## Side Effects

(Remember of "BBC Loses Viewers In Rochedale"):

- **Bradycardia**
- **Bronchoconstriction**
- **Claudication**
- **Lipids**
- **Vivid dreams & nightmares**
- **Inotropic action**
- **Reduced sensitivity to hypoglycaemia**

## Contraindicated In Renal Failure

- A- Atenolol
- N-Nadolol (longest acting beta blockers)
- S-Sotalol

- **Nadolol ---longest acting beta blockers)**
- **Esmolol ---Shortest acting beta blockers**

## References

- <https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/in-depth/beta-blockers/art-20044522>
- <https://www.webmd.com/hypertension-high-blood-pressure/guide/hypertension-treatment-beta-blockers>