

## The actions of sympathetic and parasympathetic divisions on organs:

Effector Organ	Sympathetic Effects (receptor)	Parasympathetic Effects (receptor)
Eye (iris)	Contraction of dilator pupillae muscles - mydriasis( $\alpha_1$ )	Contraction of sphincter pupillae muscles – miosis( <b>M</b> )
Eye (ciliary muscle)	Relaxation( $\beta_2$ ) for distant vision	Contraction( <b>M</b> ) for accommodation of lens (near vision) and increase aqueous humor outflow into canal of Schlemm
Eye (ciliary body epithelium)	Increased aqueous humor production( $\beta_1$ )	---
Heart	Increased heart rate, increased force of contraction and increased conduction rate ( $\beta_1, \beta_2$ )	Decreased heart and conduction rate( <b>M</b> ), decreased atrial contractility( <b>M</b> )
Arterioles(skin, abdominal viscera, kidney)	Strong vasoconstriction( $\alpha_1$ )	---
Arterioles(skeletal muscle)	Weak vasoconstriction( $\alpha_1, \beta_2$ ), vasodilation( $M_3$ )	---
Vessels(heart)	Vasoconstriction( $\alpha_1$ ), Vasodilation( $\beta_2$ )	Vasodilation( <b>M</b> on vascular endothelium), vasoconstriction( <b>M</b> on smooth muscle cells)
Lungs	Dilates Bronchioles( $\beta_2$ )	Constricts bronchioles( <b>M</b> )
Uterus, pregnant	Constriction( $\alpha_1$ ), relaxation( $\beta_2$ )	Contraction( <b>M</b> )
Gastrointestinal tract wall	Decreased tone( $\alpha_1, \alpha_2, \beta_2$ )	Increased tone( <b>M</b> )
Gastrointestinal tract sphincter	Contraction( $\alpha_1$ )	Relaxation( <b>M</b> )
Gastrointestinal tract secretion	---	Increased( <b>M</b> )
Kidney	Increased renin release( $\beta_1$ )	---
Bladder wall (detrusor muscle)	Relaxation( $\beta_2$ )	Contraction( <b>M</b> )
Internal urinary sphincter	Contraction( $\alpha_1$ )	Relaxation( <b>M</b> )
Pancreas	Decreased insulin secretion( $\alpha_2$ ), decreased exocrine secretion( $\alpha$ )	Increased insulin secretion( <b>M</b> ), increased exocrine secretion( <b>M</b> )
Fat cells	Lipolysis( $\beta_3$ )	---
Liver	Glycogenolysis ( $\alpha_1, \beta_2$ ), Gluconeogenesis( $\alpha_1, \beta_2$ )	---
Piloerector muscles of skin	Contraction( $\alpha_1$ )	---
Salivary gland	Constriction of vessels & small production of thick saliva( $\alpha_1$ )	Dilation of vessels & large production of thin saliva( <b>M</b> )
Sweat gland	Generalized sweating( <b>M</b> ) Localized sweating(stress) – palms & soles( $\alpha_1$ )	---
Adrenal medullae	Increased secretion of EPI or NE ( <b>N</b> )	---