Nicotinic/Acetylcholine and Dopamine Receptor Neuronal Signalling

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DRD1-5 are Dopamine Receptors
Physiological normal conditions: After the opening of the canal by binding to acetylcholine, the receptor becomes desensitized before it goes back to the state of rest or it is regenerated.
Continuous exposure to tobacco: Nicotine substitutes for acetylcholine and over stimulates the nicotinic receptor. Then, the receptor is long-term inactivated and its regeneration is prevented by nicotine.

3 - Tolerance and dependence on nicotine

Nicotine rises the stimulation of nicotinic receptors. The excessive and chronic activation of these receptors is balanced by a down-regulation in the number of active receptors. The reduction of the number of active receptors reduces the psychotropic effect of nicotine. Due to the phenomenon of tolerance, the smoker needs to smoke more and more cigarettes to keep a constant effect.

Nicotine activates dopamine systems within the brain. Dopamine is a neurotransmitter which is directly responsible for mediating the pleasure response. Nicotine triggers off the production of dopamine in the nucleus accumbens. A prolonged exposure of these receptors to nicotine reduces the efficiency of
Membrane Potential vs Time
DOPAMIN

LIPID

BILAY

ADENYLATE CYCLASE

DRD2

POSTSYNAPTIC

INHIBITION!
References

1. The Nervous System and Nervous Tissue, *In Openstax’s Anatomy and Physiology;* Rice University: Rice University, 2016; pp 505-533 (Free book available at: http://cnx.org/content/col11496/1.8)

