An eye into the Nobel Indanone derivatives as inhibitors: A Review

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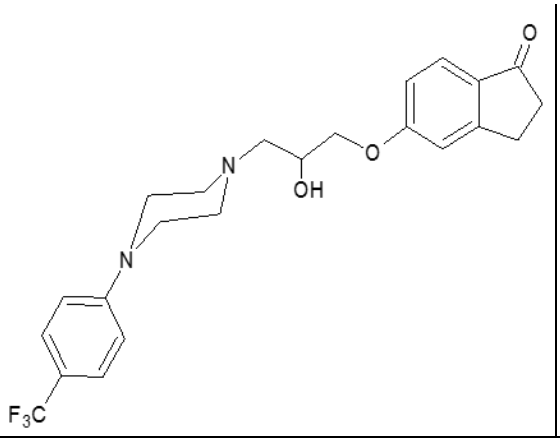
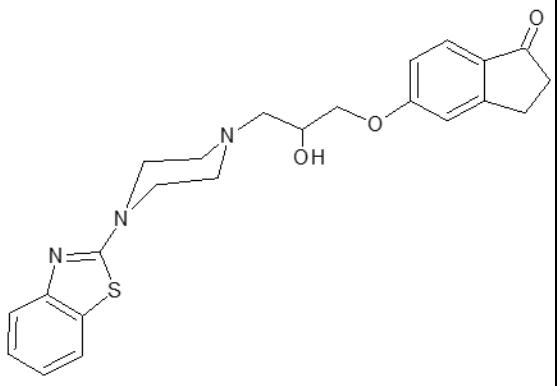
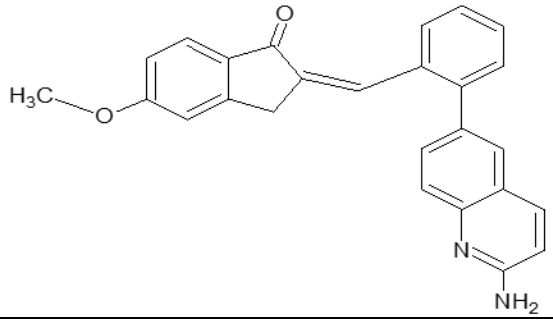
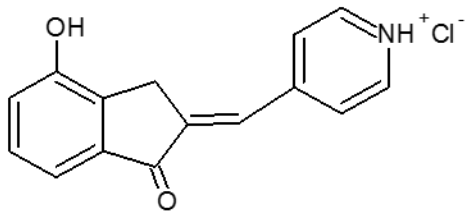
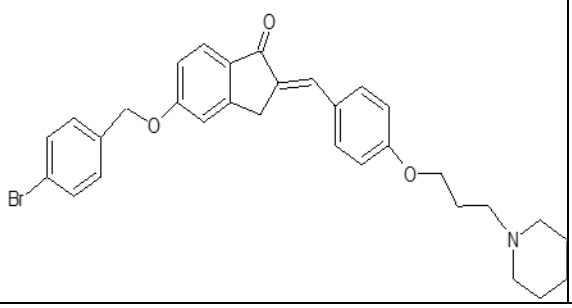
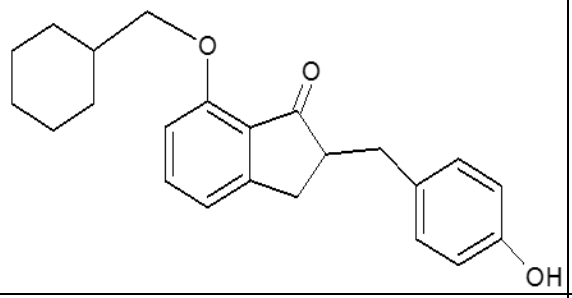
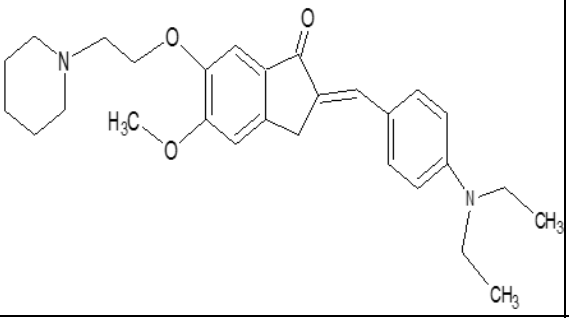
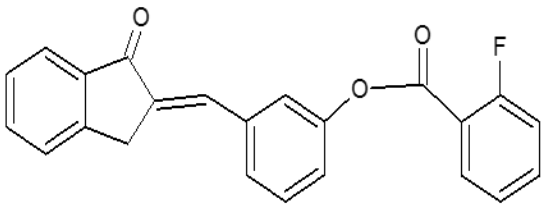
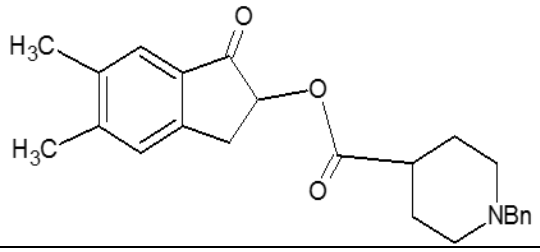
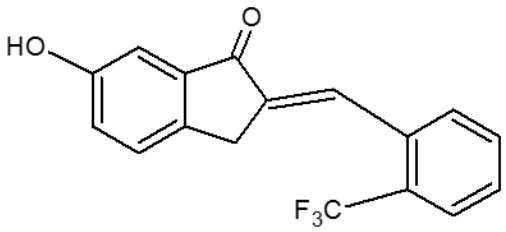
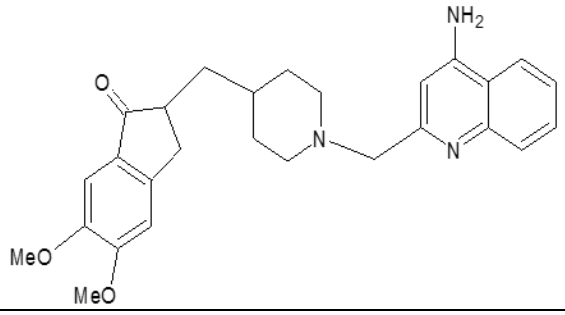
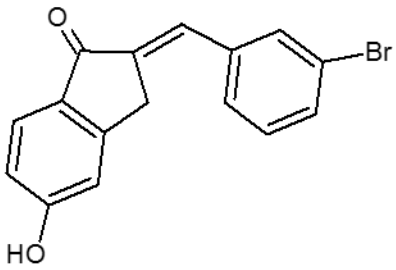
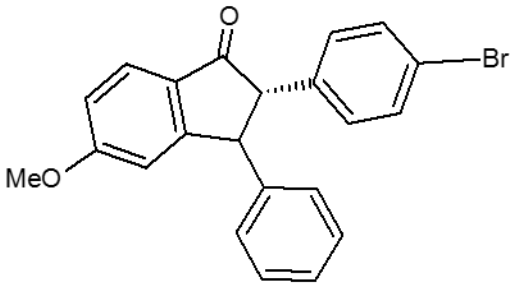
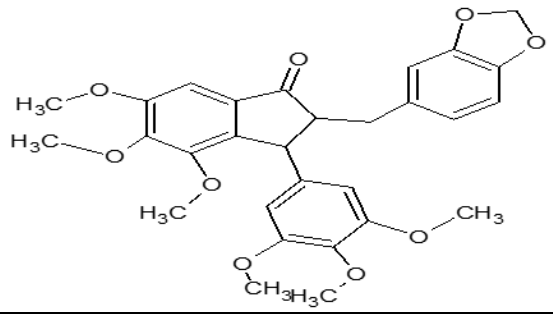
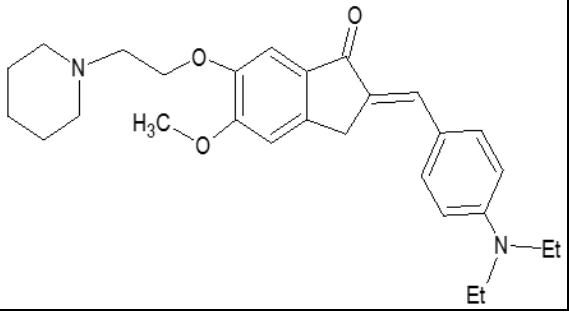
Abstract: The Nobel class on indanone derivatives as inhibitors. Having tremendous scope and potential in medicinal biology ranging from the treatment of Alzheimer to Perkinson's, which are neurodegenerative diseases. Working in the inhibition of acetylcholinesterase AChE & BACE-1, Monoamine oxidase B (MAO-B), Interleukin (IL)-5 and Angiotensin converting enzyme (ACE) etc. Present review is based on the last five year (2014-18) work published in the science direct.

Introduction: People are suffering from various diseases and every day new diseases are coming up as challenges, so researches are putting in efforts to save and give better lives to everyone. In context to this people are in search of new compounds and their derivatives. Indanone derivatives as inhibitors rightfully called as Nobel class, seeking the medical importance and applications specifically in the treatment of Alzheimer and cancer. With the development in the class of indanone derivative, we have witnessed broader and diversified spectrum of activity in biological and pharmacological world, as, antimicrobial, anti-inflammatory, analgesic, anticholinergic, dopaminergic and antiviral activities [1]. The most renowned and significant derivative if this class is donepezil, which is an active acetylcholinesterase (AChE) inhibitor. Which is recommended and approved by U.S. Food and Drug Administration (FDA) for the treatment of AD from mild to moderate to severe as well. Though the purpose served is for limited time and not for all the patients. More efforts are in progress to create new and multi-target-directed ligands for the betterment of and higher efficiency. Secondly the derivatives as (3*E*)-3-{2-[4-(3-hydroxyphenyl)-1,3-thiazol-2-yl]hydrazinylidene}-2,3-dihydro-1*H*-inden-1-one compound having potential IDO1 gene inhibitory activity or in simple words, shows anti-cancer activity [2]. 5-Hydroxy-2,3-dihydro-1H-inden-1-one like derivatives work as angiotensin converting enzyme (ACE) inhibitors which by decreasing systematic vascular resistance without altering/affecting/increasing the heart rate [3].

Sr. No	Compound	Working area	Feature/ Inhibition	Result	Reference

1		Cardiovascular and renal disease	Angiotensin converting enzyme (ACE) Inhibitor	As good as Lisinopril 100% result	[3]
2		Cardiovascular and renal disease	Angiotensin converting enzyme (ACE) Inhibitor	As good as Lisinopril 100% result	[3]
3		Alzheimer Disease (Chronic Neurodegenerative disease)	Multitarget directed ligands AChE & BACE-1	IC50 (nM) 14.7 & 13.1 Respectively	[4]
4		Colon epithelial cell	TNF-α-induced monocytes	85%	[5]
5		Perkinson's Disease	Monoamine oxidase B (MAO B) & Histamine H3 receptor	Significant results in comparison to control drug UCL2190	[6]

6		Immune and inflammatory response	InterLeukin (IL)-5 Inhibitor	100% inhibition at 30µM	[7]
7		Alzheimer Disease (Chronic Neurodegenerative disease)	Multitarget directed ligands AChE & BACE-1	85%	[8]
8		Alzheimer Disease (Chronic Neurodegenerative disease)	Angiotensin converting enzyme (ACE) Inhibitor	80%	[9]
9		Alzheimer Disease (Chronic Neurodegenerative disease)	Angiotensin converting enzyme (ACE) Inhibitor	Very high potential as IC50 value as low as 0.03	[10]
10		Anti-inflammatory	Inhibitory effect on LPS stimulated ROS production in Macrophages	efficient even with concentration as low as 1 µM	[11]

11		Alzheimer Disease (Chronic Neurodegenerative disease)	non-toxic dual binding site AChEIs	Hybrid of donepezil & Tacrine has more potency then these two	[12]
12		Perkinson's Disease	Monoamine oxidase A (MAO A) & (MAO B)	High potancy as IC50 value is 0.131 & 0.013 for MAO-A & MAO-B respectively	[13]
13		Immune and inflammatory response	LPS-stimulated RAW264.7 cells	High potency & work is still in progress	[14]
14		Cancer Cells	MCF-7 and MDA-MB-231 cells. Moreover potent cytotoxicities against various human carcinoma cells and	(IC50 = 0.010–14.76 lM)	[15]
15		Alzheimer Disease (Chronic Neurodegenerative disease)	Multitarget directed ligands AChE & BACE-1 amyloid Beta (Aβ) inhibition	(IC50 = 14. nM) with 85% inhibition result	[16]

Conclusion: As these are Nobel derivatives there is always a hope for the betterment. Looking at the structural modifications done in the past five years still there is an ample amount of work that can be done and still lot of scope to improve the results.

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