



Contents lists available at ScienceDirect

## European Journal of Medicinal Chemistry

journal homepage: <http://www.elsevier.com/locate/ejmech>

Review article

## Recent developments in biological activities of indanones

Siddappa A. Patil <sup>a, \*\*</sup>, Renukadevi Patil <sup>b</sup>, Shivaputra A. Patil <sup>b, \*</sup><sup>a</sup> Centre for Nano and Material Sciences, Jain University, Jain Global Campus, Kanakapura, Ramanagaram, Bangalore 562112, India<sup>b</sup> Pharmaceutical Sciences Department, College of Pharmacy, Rosalind Franklin University of Medicine and Science, 3333 Green Bay Road, North Chicago, IL 60064, USA

## ARTICLE INFO

## Article history:

Received 15 April 2017

Received in revised form

17 June 2017

Accepted 20 June 2017

Available online 21 June 2017

## Keywords:

Antialzheimer

Anticancer

Antimicrobial

Antiviral

Indanone

Pharmaceutical agent

## ABSTRACT

Indanone is one of the privileged structures in medicinal chemistry and it's commonly associated with various pharmacologically active compounds. The indanone moiety is found in several natural compounds and also, it can be used as intermediate in the synthesis of many different types of medicinally important molecules. Among the medicinally important indanones, the most significant drug probably is donepezil (**IV**), an acetylcholinesterase (AChE) inhibitor, which has been approved by the US Food and Drug Administration for the treatment of Alzheimer's disease (AD). Along with donepezil, the indanone moiety can be seen in a number of other pre-clinical and clinical candidates which belong to different categories with diverse therapeutic activities. In summary, the present review article encompasses the recent biological applications such as antialzheimer, anticancer, antimicrobial and antiviral activity of various indanone derivatives.

© 2017 Elsevier Masson SAS. All rights reserved.

## Contents

1. Introduction .....	182
2. Chemistry .....	184
3. Pharmacological activities of the indanone analogs .....	184
3.1. Indanones as antialzheimer agents .....	184
3.2. Indanones as anticancer agents .....	190
3.3. Indanones as antimicrobial agents .....	191
3.4. Indanones as antiviral agents .....	193
4. Conclusion and future aspects .....	195
Conflict of interests .....	195
Acknowledgment .....	195
Supplementary data .....	195
References .....	195

## 1. Introduction

Indanone is one of the privileged structures in medicinal chemistry and is commonly associated with various

pharmacologically active compounds. Indanones have demonstrated a broad spectrum of biological activity. Moreover, they are very useful synthons for the synthesis of various carbocyclic and heterocyclic molecules as synthetic intermediates for several drugs and natural products [1–8]. Their important biological activities include antiinflammatory [9–13], analgesic [14], antimicrobial [15,16], anticholinergic [17,18], dopaminergic [19], anticancer [20] and antimalarial [21] activities. The indanone moiety is present in various bioactive natural products. The important natural products

\* Corresponding author.

\*\* Corresponding author.

E-mail addresses: [p.siddappa@jainuniversity.ac.in](mailto:p.siddappa@jainuniversity.ac.in) (S.A. Patil), [shivaputra.patil@rosalindfranklin.edu](mailto:shivaputra.patil@rosalindfranklin.edu) (S.A. Patil).

### Abbreviations

AD	Alzheimer's disease
AChE	Acetylcholinesterase
BChE	Butylcholinesterase
BACE1	$\beta$ -Site amyloid precursor protein cleaving enzyme 1
SAR	Structure-activity relationship
HDACs	Histone deacetylases
ACh	Acetylcholine
IC <sub>50</sub>	Half maximal inhibitory concentration
MAO-B	Monoamine oxidases B
BBB	Blood brain barrier
$\mu$ M	Micromolar
nM	Nanomolar
GI <sub>50</sub>	The concentration of drug to cause 50% reduction in proliferation

<i>S. aureus</i>	<i>Staphylococcus aureus</i>
<i>E. coli</i>	<i>Escherichia coli</i>
<i>K. pneumonia</i>	<i>Klebsiella pneumonia</i>
<i>A. baumannii</i>	<i>Acinetobacter baumannii</i>
<i>Paeruginosa</i>	<i>Pseudomonas aeruginosa</i>
<i>C. albicans</i>	<i>Candida albicans</i>
<i>C. neoformans</i>	<i>Cryptococcus neoformans</i>
<i>A. clavatus</i>	<i>Aspergillus clavatus</i>
<i>B. subtilis</i>	<i>Bacillus subtilis</i>
<i>M. luteusgenes</i>	<i>Micrococcus luteusgenes</i>
<i>L. Monocytogenes</i>	<i>Listeria monocytogenes</i>
<i>A. Niger</i>	<i>Aspergillus niger</i>
<i>T. mentagrophites</i>	<i>Trichophyton mentagrophites</i>
RBV	Ribavirin

such as 1-methoxy-6-methyl-3-oxo-2,3-dihydro-1*H*-indene-4-carbaldehyde (**I**) and Pterisin B (**II**) were isolated from marine cyanobacterium and *Pteris ensiformisburm* (Fig. 1) [22,23]. Another important natural product having the indanone ring system is a potential anti-viral polyphenolic derivative Paucifloral F (**III**) (Fig. 1) and its isomer isopaucifloral F is a potential anti-osteoporosis agent [24,25]. Because of the biological importance of the indanone core, past several years researchers have produced library of pharmacologically active indanones. Very recently, our laboratory reported the novel indonone analogs as antiviral and antimicrobial agents [26,27]. Among them the most significant drug that bears an indanone moiety is probably donepezil (**IV**), an acetylcholinesterase (AChE) inhibitor, which has been approved by the US Food and Drug Administration for the treatment of Alzheimer's disease (AD). Along with donepezil, the indanone moiety can be noticed in a number of other pharmacologically active molecules that belong to different categories with diverse therapeutic activities [28–32] (Fig. 1).

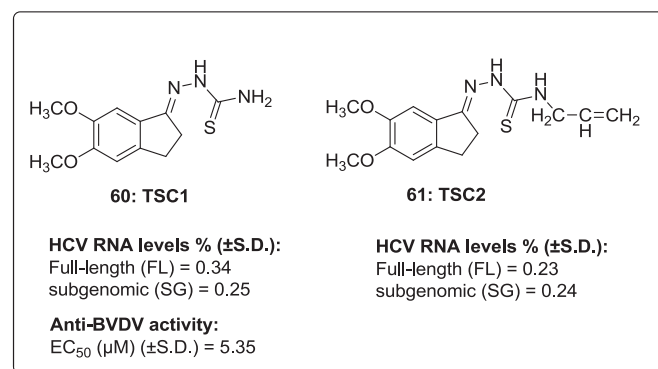


Fig. 2. 1-Indanone thiosemicarbazone derivatives.

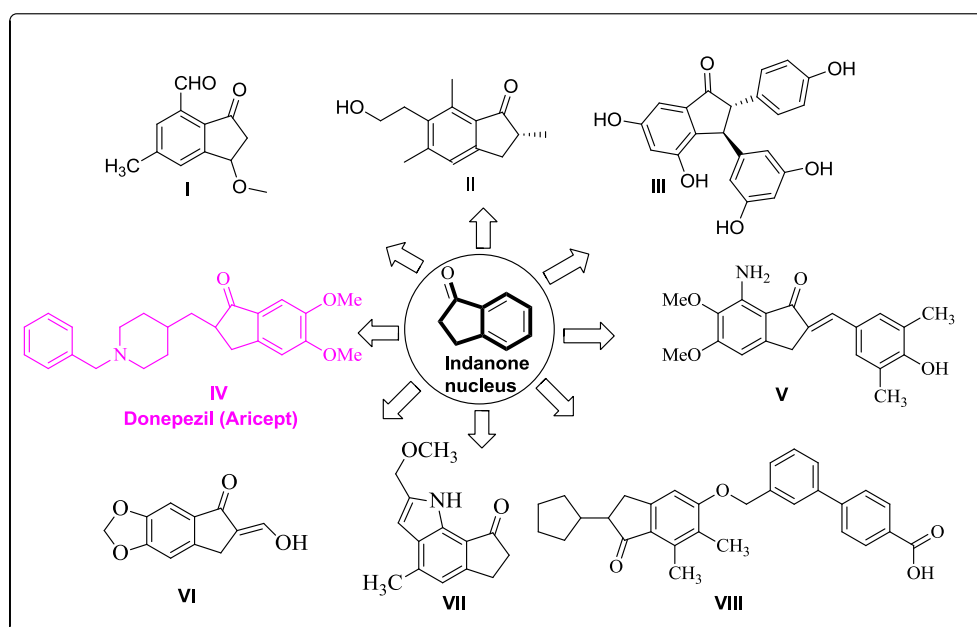


Fig. 1. Pharmacologically active important natural and unnatural products bearing indanone moiety.

Download English Version:

<https://daneshyari.com/en/article/5158690>

Download Persian Version:

<https://daneshyari.com/article/5158690>

[Daneshyari.com](https://daneshyari.com)