Different Pharmacological Activities of 2,5-Disubstituted 1,3,4-Oxadiazoles

Dr. M Srinivasa Murthy¹, Dr. M Sudhakar², Aleti Rajareddy³, Dr. Vinay Umesh Rao

¹Vignan Institute of Pharmaceutical Sciences, Deshmukhi, Hyderabad.
²Mallareddy College of Pharmacy, Maisammaguda, Hyderabad-500014

Abstract: 1,3,4-Oxadiazole is a versatile heterocyclic nucleus which attract the medicinal chemist to search a new therapeutic molecule, out of the various derivatives 2,5 disubstituted 1,3,4-oxadiazole is widely exploited for various biological activities, such as antimicrobial, anticonvulsant, antiviral, anticancer, antitubercular and antioxidant etc. This review is mainly focused on oxadiazoles derivatives which are already developed and also which are currently under various stages of development.

Keywords: 1,3,4-oxadiazoles, antimicrobial, anticancer, antitubercular, anti-inflammatory activities.

INTRODUCTION
Heterocyclic compounds have attracted the attention of medicinal chemists because of having broad spectrum of pharmacological activities and hence it continues to yield new medicinal agents one such heterocyclic nucleus of medicin importance is oxadiazole nucleus. 1,3,4-oxadiazole nucleus are known to exhibit Unique anti-inflammatory activity [1-4].

Given below is a brief account of various biological and pharmacological activities of 2,5 disubstituted 1,3,4-oxadiazoles.

PHARMACOLOGICAL ACTIVITIES OF 1,3,4-OXADIAZOLE AND THEIR DERIVATIVES

Antipyreric activity


Antimicrobial activity

N. Bhardwajand K. Saraf [13] synthesized, evaluated some 1,3,4-oxadiazoles for antimicrobial activity.

N. B. Patel And J. C. Patel [14] synthesized 3-(1,3,4-Oxadiazol-2yl)quinazolin-4(3H)-ones for antimicrobial activity.

Chao Jun-Shu, Huia Ping-Xin and Liashuo [15] synthesized 1,3,4-oxadiazoles for antimicrobial activity.

R. Saini, K. A. Rai and A. N. Keshri [17] synthesized 2,5-di-substituted 1, 3, 4-oxadiazoles for antimicrobial activity.

Aates OÆznur and Kocabalkanli [18] synthesized some aryl 2-[(N,N disubstituted thiocarbamoyl thio acylamino]-1,3,4 oxadiazoles for antimicrobial activity.

G.C.Ramaprasad, B.Kalluraya and S. B.Kumar [19] synthesized some novel 1,3,4-oxadiazoles for antimicrobial activity.


S.Kumar [21] synthesized 5-substituted-2-amino-1,3,4-oxadiazolederivatives for antimicrobial activity.

N. K. Fuloria, V. and M. Ali [22]; synthesized some new oxadiazoles derived from Phenylpropionylhydrazides for antimicrobial activity.

K. K. Jha, S. Abdul and K. Yatendra [23];Designed, synthesized 1,3,4-oxadiazolederivatives for antimicrobial activity.

S. N. Channamata, B. Poojary and S. K. Narilu [24]; synthesized, some disubstituted 1,3,4-oxadiazoles carrying 2(aryloxy)methyl]phenyl moiety for antimicrobial activity.

Anti-inflammatory activity

M. M.Burbuliene, J. Virginija and Mekuskiene [27] synthesized 5-[2-disubstituted amino-6methyl-pyrimidin-4-yl]-sulfanyl methyl]-3H-1,3,4-oxadiazole-2-thiones for anti-inflammatory activity.

A.Husain and A.Mohammed [28] synthesized of novel 1,3,4-oxadiazole derivatives for their anti-inflammatory properties.

H. Kumar, J. A. Sadique Khan and A. Suroor [29] synthesized 1,3,4-oxadiazole/thiadiazole and 1,2,4-triazole derivatives of biphenyl-4-yloxy acetic acid for anti-inflammatory activity.

P. Erhan, S. Gulay, K. Pelin [31] synthesized 1-acylthiosemicarbazides, 1,3,4-oxadiazoles, 1,3,4-thiadiazoles and 1,2,4-triazole-3-thiones for anti-inflammatory activity.


A.K. Singh, R. Parthsarthy and M. Lohani [33] synthesized some 1,3,4-oxadiazole derivatives for anti-inflammatory activity.

M. Akhter, A. Husain, B. Azad and Mohd. Ajmal [34] synthesized Aroylpropionic acid based 2,5-disubstituted-1,3,4-oxadiazoles and evaluated their anti-inflammatory activity.

A.Husain and A. Mohammed [35], synthesized novel 1,3,4-oxadiazole derivatives and evaluated their analgesic properties.


D. Dhansay and A. Pandey [37] synthesized some novel 2,5-Disubstituted 1,3,4-Oxadiazole and evaluated their Analgesic, Anti-Inflammatory, Anti-Bacterial and Anti Tubercular Activity.

B. Jayashankar [38] synthesized 2, 5-Disubstituted 1, 3, 4-Oxadiazole and evaluated their analgesic activity.

K. Selvakumar [39] synthesized, characterized 1,3,4-oxadiazole derivatives and evaluated their analgesic activity.

Anticonvulsant activity

Y. Mohammad and W. MohdAkhter [40] synthesized substituted oxadiazole and thiadiazole derivatives and evaluated for anticonvulsant activity.
Z. Afshin, H. Samaneh, T. Fatemeh [41] synthesized new 2-substituted-5-[2-(2-halobenzyl)thio]phenyl]-1,3,4-oxadiazoles evaluated as anticonvulsant agents.


**Anti Tumor activity**

S. Bondock [48] synthesized some new 1,3,4-oxadiazole and evaluated for antitumor activity.

**Pulmonary Vasodilatory activity**

P. J. Shirote and M. S. Bhatia [49] synthesized some novel 1,3,4oxadiazoles and evaluated for pulmonary vasodilatory activity.

A.Zarghi, Tabatabai S. A., Faizi Ahadian A. [42] synthesized new 2-substituted benzyloxyphenyl -1,3,4-oxadiazoles and evaluated as anticonvulsant agents.

A.Almasirad, T. Sand and Faizi M [43] synthesized new 2-substituted-5-[2-(2-fluorophenoxy)phenyl]1,3,4-oxadiazole and 1,2,4-triazoles and evaluate their anticonvulsant activity.

A. Almasirad, T. Sand and Faizi M [43] synthesized new 2-substituted-5-[2-(2-fluorophenoxy)phenyl]1,3,4-oxadiazole and 1,2,4-triazoles and evaluate their anticonvulsant activity.


Yarshahar M, Siddiqui Ahmed A and Aliashraf M [45] synthesized and evaluated anti-tuberculostatic activity of novel 1,3,4-oxadiazole derivatives.
CONCLUSION
This review highlights the therapeutic properties of the 1,3,4-oxadiazole ring and found to be promising as it is related to diverse range of pharmacological activities. Thus this paper proves to be significant for further research work on the bioactive oxadiazole ring.

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