# *Antimicrobial activity of statins against fungi and bacterial species*

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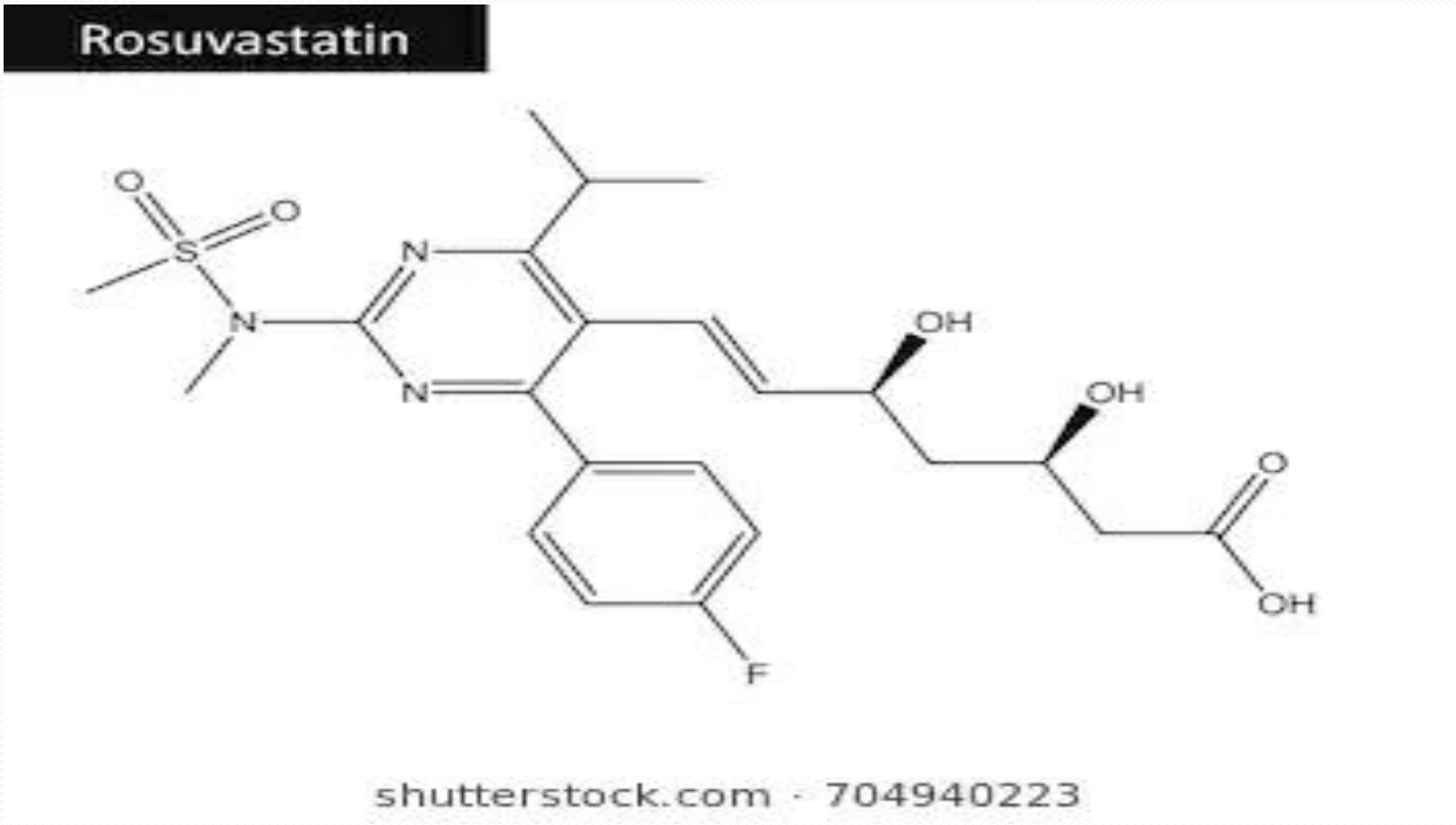
# Abstract

The in vitro antifungal activity of different statins (fluvastatin and rosuvastatin) were investigated in this study on 3 fungal isolates representing clinically important genera, namely *C. parapsilosis* , *C.albicans* , *Candida krusei and Staph. aureus* , *E.coli*. The antifungal effects of statins revealed substantial differences. The synthetic statins proved to be more effective than the fungal metabolites. Results suggest that statins have a therapeutic potential against fungal infections.

# Introduction

The incidence of invasive fungal infections (IFIs) is increasing because of the growing number of immunocompromised hosts and the occurrence of antibiotic resistant strains. The major risk factors for these diseases are the administration of broad-spectrum antibiotics, corticosteroids and cytotoxic agents, intravenous catheters, invasive medical procedures, human immunodeficiency virus infection, poorly controlled diabetes mellitus, hematological malignancy, solid organ or bone marrow transplantation, steroid use, metabolic acidosis, deferoxamine therapy, and severe and prolonged neutropenia

# Structure


Rosuvastatin
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# Material and methods

statin drugs are available in market . like atorvastatin , rusovastatin and simvastatin

# Preparation of test solution

the solution was prepared by disolve one tablet (80 mg atorvastatin ) in 80 ml of methanol for one hour under stirring to make stock solution and other solution of rusovastatin prepared in the same method

# *Test organisms*

The strains used in this study (*C. parapsilosis , C.albicans , Candida krusei and Staph. aureus , E.coli*) were all isolated from patients with previous diagnoses and treated at the Hospital and were stored at the Research Center in the pharmacy colloge

# Culture media

The media use for antibacterial and anti fungal testing was nutrient agar and sabouraud's dextrose agar , respectively of HiMedia pvt . Ltd .,Mumbai _400 086 .

# *Inoculum preparation*

The synthesized compounds were screened in vitro for their antibacterial activity against *C. parapsilosis* , *C.albicans* , *Candida krusei and* , *E.coli* ,*Staphylococcus aureus* using the paper disc-agar diffusion technique on Muller Hinton agar as a culture media for antibacterial activity . The test compounds were dissolved inDMSO solvent and recommended concentration of (50,100,200µg/ml) were used in the disc-agar diffusion technique

# Results

| Drug | C.parapsilosis | C.albicans | Candida krusei | E.coli | Staph. Aureus |
|---|---|---|---|---|---|
| Atorvastatin | 8mm | 9mm | 11mm | 0 | 0 |
| Rusovastatine | 9mm | 11mm | 10mm | 0 | 0 |

| Drug | C.parapsilosis | C.albicans | Candida krusei | E.coli | Staph. Aureus |
|---|---|---|---|---|---|
| Atorvastatin | **11mm** | **13mm** | **17mm** | **8mm** | **10mm** |
| Rusovastatine | **13mm** | **16mm** | **15mm** | **7mm** | **8mm** |

# Discussion

In the present study, we found that atorvastatin and rosuvastatin can inhibit the growth of the isolated fungi in both concentrations (0.1mg per ml and 0.5mg per ml) while bacteria species did not show any sensitization to the statin substances in the concentration (0.1mg per ml) that's mean depend on concentration directly , although the experiment was repeated at higher concentrations and show sensitization to all species . C.parapsilosis and C.albicans less sensitive to atorvastatin from rosuvastatin while Candida krusei is more sensitive to atorvastatin than rosuvastatin .

# Reference


- Kontoyiannis DP, Bodey GP. Invasive aspergillosis in 2002: an update, Eur J Clin Microbiol Infect Dis , 2002, vol. 21 (pg. 161-172)
- Chamilos G, Kontoyiannis DP. Update on antifungal drug resistance mechanisms of Aspergillus fumigatus, Drug Resist Updat , 2005, vol. 8 (pg. 344-358)
- Pfaller MA, Diekema DJ. Rare and emerging opportunistic fungal pathogens: concern for resistance beyond Candida albicans and Aspergillus fumigatus, J Clin Microbiol , 2004, vol. 42 (pg. 4419-4431)
- Chen J, Li H, Li R, Bu D, Wan Z. Mutations in the cyp51A gene and susceptibility to itraconazole in Aspergillus fumigatus serially isolated from a patient with lung aspergilloma, J Antimicrob Chemother , 2005, vol. 55 (pg. 31-37)
- Miida T, Hirayama S, Nakamura Y. Cholesterol-independent effects of statins and new therapeutic targets: ischemic stroke and dementia, J Atheroscler Thromb , 2004, vol. 11 (pg. 253-264)