Synthesis of Novel 2-Phenylindole Analogues as Antifungal and Antibacterial Agents

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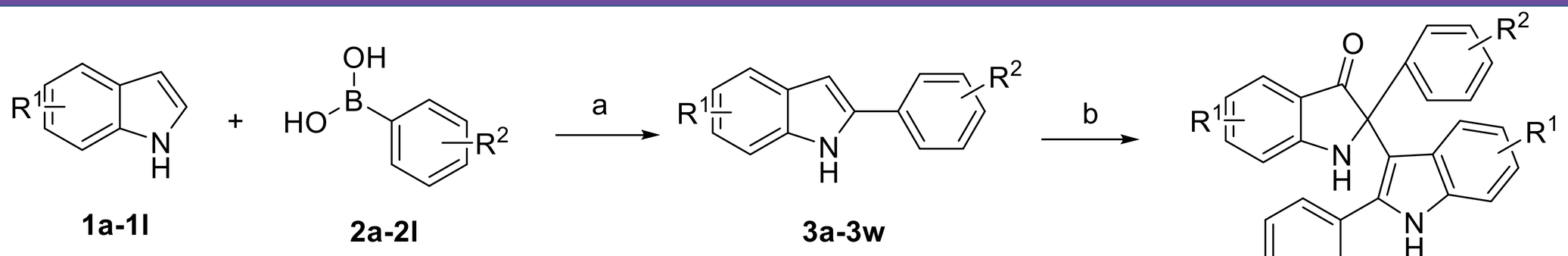
Introdaction

Steady increase in microbial pathogens that are ineffective with conventional therapy poses a major threat to global public health. Fungal and bacterial infections are increasingly resistant to currently available antimicrobial drugs, such as antibiotics. Therefore, new drugs targeting these pathogens are urgently needed. Indole structures are prevalent in natural products, and by changing the substituents in various places of the indole backbone, it is possible to create 2-arylindole derivatives with antibacterial and antifungal, antimalarial, anticancer, and other biological actions.

Results



R^1=F、Cl、Br、OCH_3、CH_3、$COOCH_3$、N-CH_3... a:$Pd(OAc)_2$, HOAc; r,t. stir

R^2=F、Cl、CH_3、OCH_3、CF_3、NO_2、CH_2O_2... b:$TEMPO^+BF_4^-$, THF; r.t. stir

Fig.1 Synthesis of the target compounds

Table 1 In vitro activity of synthetic compounds

Drugs	Structure	MIC_s(μg/mL)					
		Fungal			Bacteria		
		C.albicans	*C. neoformans*	*A. fumigatus*	*S. aureus*	*E. coli*	*P. aeruginosa*
3o	R^1=H,R^2=2-CH_3	4	2	16	8	8	256
3f	R^1=6-Cl,R^2=H	16	16	8	8	16	16
3r	R^1=H,R^2=3-OCH_3	16	4	8	64	4	8
Fluconazole		2	2	2	-	-	-
Amphotericin B		2	64	16	-	-	-
Streptomycin		-	-	-	2	2	2

Conclutions

This paper provides a facile and efficient method for the synthesis of 2-phenylindoles by the reaction of various substituted indoles with phenylboronic acids catalyzed by $Pd(OAc)_2$ and $Pd(OAc)_2$. Yields of 40% - 87% were achieved. The antibacterial activity of the synthesized compounds was then tested with sensitive strains. The results showed that most of the compounds exhibited relatively excellent inhibitory activities against different strains(mic of 2-32 μg/ml). The results of this study suggest some candidates for the development of new therapeutic options for invasive infections and also provide targets for further exploration

References
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