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Design, synthesis and biological evaluation of piperazinyl- β -carboline derivatives as anti-leishmanial agents

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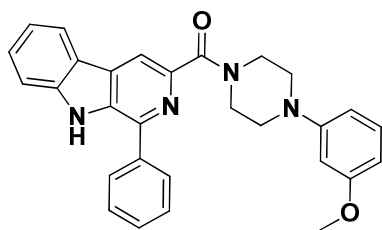
Design, synthesis and biological evaluation of (1-phenyl-9*H*-pyrido[3,4-*b*]indol-3-yl)(4-phenylpiperazin-1-yl)methanone derivatives as anti-leishmanial agents

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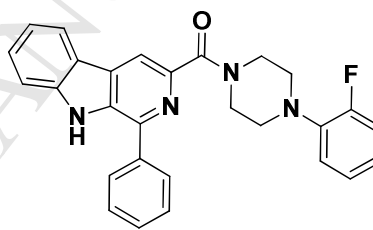
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Graphical Abstract



Compound **7e**, activity against *L. infantum*
 $EC_{50} = 2.89 \pm 0.34 \mu\text{M}$ (Promastigotes)
 $= 2.80 \pm 0.13 \mu\text{M}$ (Axenic amastigotes)



Compound **7k**, activity against *L. donovani*
 $EC_{50} = 3.47 \pm 0.17 \mu\text{M}$ (Promastigotes)
 $= 2.80 \pm 0.10 \mu\text{M}$ (Axenic amastigotes)
 $= 4.00 \pm 0.60 \mu\text{M}$ (Intracellular amastigotes)

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