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Unprecedented combination of Metal- and Bio-catalyzed organic reactions in non-conventional reaction media for the synthesis of enantiopure valuable organic products

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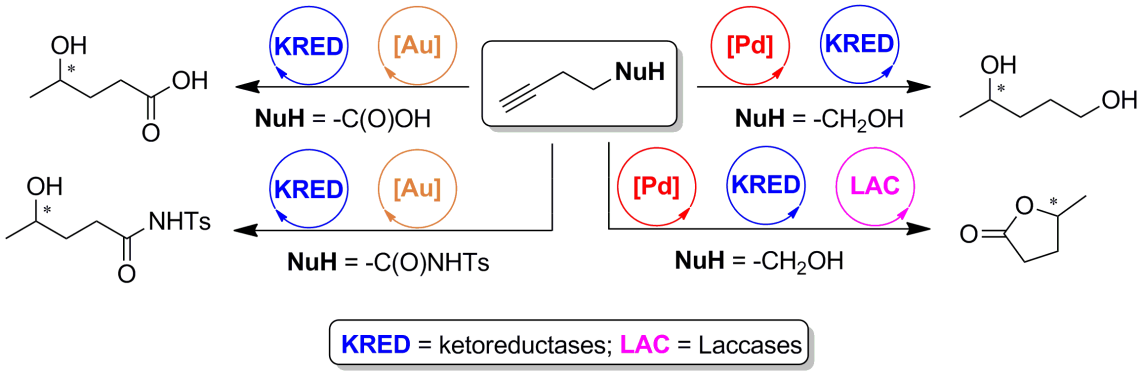
Due to the increasing rate of production of the *Chemical Industry*, it is necessary to design new cleaner and more efficient one-pot multi-step cascades in green solvents (*i.e.*, water). These one-pot transformations are emerging as exciting alternatives to highly-costly and tedious step-by-step processes, which also: *i*) minimise chemical waste; *ii*) save time; and *iii*) simplify practical aspects.[1] In this sense, we have previously reported the successful combination of the Ru(IV)-catalyzed redox isomerization of allylic alcohols (for the transient formation of the desired pro-chiral ketones) with a concomitant bioreduction (promoted by ketoreductases, *KREDs*) or bioamination (promoted by ω-transaminases, ω-TA).[2] In this communication, we present the unprecedented combination of the three following reactions in aqueous media: *i*) Pd(II)- or Au(I)-catalyzed cycloisomerizations of alkynols, *γ*-alkynoic acids or alkynyl amides;[3] *ii*) spontaneous and concomitant hydrolysis of the obtained 5-membered heterocycles; and *iii*) enantioselective bioreduction of the corresponding prochiral ketones.[4]



Keywords: Metal-Catalyzed; Bio-catalyzed; One-pot Tandem; Aqueous media; Enantiopure Compounds

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