Table 1. Enzymes listed in order of decreasing catalytic proficiency.*

Enzyme	Nonenzymatic $t_{1/2}$*	k_{non}* (s^{-1})	k_{cat}† (s^{-1})	k_{cat}/K_m† ($s^{-1}\ M^{-1}$)	Rate enhancement (k_{cat}/k_{non})	Catalytic proficiency [$(k_{cat}/K_m)/k_{non}$] (M^{-1})
OMP decarboxylase	78,000,000 years	2.8×10^{-16}	39	5.6×10^{7}	1.4×10^{17}	2.0×10^{23}
Staphylococcal nuclease	130,000 years	1.7×10^{-13}	95	1.0×10^{7}	5.6×10^{14}	5.9×10^{19}
Adenosine deaminase	120 years	1.8×10^{-10}	370	1.4×10^{7}	2.1×10^{12}	7.8×10^{16}
AMP nucleosidase	69,000 years	1.0×10^{-11}	60	5.0×10^{5}	6.0×10^{12}	5.0×10^{16}
Cytidine deaminase	69 years	3.2×10^{-10}	299	2.9×10^{6}	1.2×10^{12}	9.1×10^{15}
Phosphotriesterase	2.9 years	7.5×10^{-9}	2100	4.0×10^{7}	2.8×10^{11}	5.3×10^{15}
Carboxypeptidase A	7.3 years	3.0×10^{-9}	578	6.6×10^{6}	1.9×10^{11}	2.2×10^{15}
Ketosteroid isomerase	7 weeks	1.7×10^{-7}	66000	3.0×10^{8}	3.9×10^{11}	1.8×10^{15}
Triosephosphate isomerase	1.9 days	4.3×10^{-6}	4300	2.4×10^{8}	1.0×10^{9}	5.6×10^{13}
Chorismate mutase	7.4 hours	2.6×10^{-5}	50	1.1×10^{6}	1.9×10^{6}	4.2×10^{10}
Carbonic anhydrase	5 s	1.3×10^{-1}	1×10^{6}	1.2×10^{8}	7.7×10^{6}	9.2×10^{8}
Cyclophilin, human	23 s	2.8×10^{-2}	13000	1.5×10^{7}	4.6×10^{5}	5.3×10^{8}

*Nonenzymatic reaction rate constants were obtained for OMP decarboxylase and staphylococcal nuclease from the present work, for adenosine and cytidine deaminases from (*5*), for AMP nucleosidase from (*25*), for phosphotriesterase from (*26*), for carboxypeptidase A from (*3*), for ketosteroid isomerase from (*27*), for triosephosphate isomerase from (*28*), for chorismate mutase from (*4*), for carbonic anhydrase from (*2*), and for cyclophilin from (*3*). †Enzyme reaction rate constants were obtained for OMP decarboxylase from (*7*), for staphylococcal nuclease from (*29*), for adenosine deaminase from (*30*), for AMP nucleosidase from (*31*), for phosphotriesterase from (*26*), for carboxypeptidase A from (*32*), for ketosteroid isomerase from (*33*), for triosephosphate isomerase from (*34*), for chorismate mutase from (*4*), for carbonic anhydrase from (*35*), and for cyclophilin from (*36*).