

TABLE 4.21

Some Representative Kinetic Data on Enzyme Systems

A. The half-saturation concentration, K_m ^a			B. The turnover number (from V_{max}/Tot ; Tot, the concentration of enzyme) ^b	
Enzyme	Substrate	K_m (mM)	Enzyme	Turnover number (sec ⁻¹)
Catalase	H ₂ O ₂	25	Carbonic anhydrase	10 ⁶ s
Hexokinase	Glucose	0.15	Acetylcholinesterase	10 ⁴
Hexokinase	Fructose	1.5	Urease	10 ⁴
Chymotrypsin	<i>N</i> -Benzoyltyrosinamide	2.5	Fumarase	10 ³
Chymotrypsin	Glycyltyrosinamide	122	Transaminases	10 ³
Carbonic anhydrase	HCO ₃ ⁻	9.0	Chymotrypsin	10 ² - 10 ³
Glutamate dehydrogenase	Glutamate	0.12	Ribonuclease A	10 ² - 10 ⁴
Glutamate dehydrogenase	NH ₄ ⁺	57	Carboxypeptidase	10 ²
Glutamate dehydrogenase	NAD _{ox}	0.025		
Glutamate dehydrogenase	NAD _{red}	0.018		

C. Association (k_1) and dissociation (k_{-1}) rate constants and time constants ($t_{1/2}$) for conformation changes for enzyme-ligand complexes^b

Enzyme	Substrate	k_1 (M ⁻¹ sec ⁻¹)	k_{-1} (sec ⁻¹)	$t_{1/2}$ (sec)
Alcohol dehydrogenase, liver	NADH-imidazole	—	—	10 ⁻³
Alkaline phosphatase	2-Hydroxy-5-nitrobenzyl phosphate	—	—	10 ⁻²
Aspartate aminotransferase	α -Methylaspartate	1.2×10^4	1.3×10^2	10 ⁻²
Aspartate aminotransferase	Glutamate; aspartate	$>10^7$ - 10^8	$>10^5$ - 10^6	—
Aspartate aminotransferase	NH ₂ OH	3.7×10^6	6.2×10	—
Chymotrypsin	Proflavin	1.1×10^8	2.2×10^3	10 ⁻⁴
Creatine kinase	MgADP	5.3×10^6	5.1×10^3	10 ⁻⁴
Glyceraldehyde-3-phosphate dehydrogenase	NAD	—	—	1
Lactate dehydrogenase, rabbit muscle	NADH	$\sim 10^9$	$\sim 10^4$	10 ⁻³
Lactate dehydrogenase, pig heart	NADH	5.5×10^7	3.9×10	—
Lactate dehydrogenase, pig heart	3-Thio-NAD	5.8×10^6	4.1×10^2	—
Malate dehydrogenase	NADH	5×10^8	5×10	—
Old yellow enzyme	FMN	1.5×10^6	$\sim 10^{-4}$	—
Peroxidase	H ₂ O ₂ ; methyl and ethyl H ₂ O ₂	—	—	10 ⁻¹
Pyruvate kinase	Mn ²⁺ ; fluorophosphate	1.3×10^7	3.4×10^4	10 ⁻⁴
Ribonuclease A	Cytidine 3'-phosphate	4.6×10^7	4.2×10^3	10 ⁻³ -10 ⁻⁴
Ribonuclease A	Uridine 3'-phosphate	7.8×10^7	1.1×10^4	10 ⁻³ -10 ⁻⁴

^a Data from Lehninger (1982).^b Data from Cantor and Schimmel (1980).