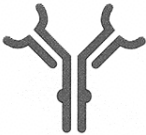

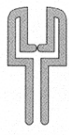






Molecole in Grado di Legare l'Antigene			
	Ig	TCR	Molecole MHC*
Caratteristiche			
Sito di legame per l'antigene	Formato da tre CDR in V_H e tre CDR in V_L	Formato da tre CDR in V_α e tre CDR in V_β	Tasca di legame per il peptide formata da $\alpha 1$ ed $\alpha 2$ (classe I) o $\alpha 1$ e $\beta 1$ (classe II)
Natura dell'antigene legato	Macromolecole (proteine, lipidi, polisaccaridi) e piccoli composti chimici	Complessi MHC-peptide	Peptidi
Determinanti antigenici nelle macromolecole riconosciute	Lineari e conformazionali	Lineari; solo 2 o 3 residui aminoacidici del peptide legato alla molecola MHC	Lineari; solo alcuni residui aminoacidici del peptide
Affinità di legame	K_d 10^{-7} - 10^{-11} M; l'affinità media delle Ig aumenta nel corso delle risposte immunitarie	K_d 10^{-5} - 10^{-7} M	K_d 10^{-6} M
Tasso di associazione	TA rapido, TD variabile	TA basso, TD basso	TA basso, TD molto basso
<p>*La struttura e la funzione delle molecole MHC e del TCR sono discusse rispettivamente nei Capitoli 4 e 6. Abbreviazioni: CDR, regione che determina la complementarità; Ig, immunoglobulina; K_d, costante di dissociazione; MHC, complesso maggiore di istocompatibilità; TA, tasso di associazione; TCR, recettore per l'antigene dei linfociti T; TD, tasso di dissociazione; V_H, dominio variabile della catena pesante; V_L, dominio variabile della catena leggera.</p>			

Factors that influence the immunogenicity of proteins		
Parameter	Increased immunogenicity	Decreased immunogenicity
Size	Large	Small (MW<2500)
Dose	Intermediate	High or low
Route	Subcutaneous > intraperitoneal > intravenous or intragastric	
Composition	Complex	Simple
Form	Particulate	Soluble
	Denatured	Native
Similarity to self protein	Multiple differences	Few differences
Adjuvants	Slow release	Rapid release
	Bacteria	No bacteria
Interaction with host MHC	Effective	Ineffective

Figure A-2 Immunobiology, 6/e. (© Garland Science 2005)

	 T cell receptor (TCR)	 Immunoglobulin (Ig)
Components	α and β chains	Heavy and light chains
Number of Ig domains	One V domain and one C domain in each chain	Heavy chain: one V domain, three or four C domains Light chain: one V domain and one C domain
Number of CDRs	Three in each chain for antigen binding; fourth hypervariable region in β chain (of unknown function)	Three in each chain
Associated signaling molecules	CD3 and ζ	Ig α and Ig β
Affinity for antigen (K_d)	10^{-5} - 10^{-7} M	10^{-7} - 10^{-11} M (secreted Ig)
Changes after cellular activation		
Production of secreted form	No	Yes
Isotype switching	No	Yes
Somatic mutations	No	Yes

	 T cell receptor (TCR)	 Immunoglobulin (Ig)
Components	α and β chains	Heavy and light chains
Number of Ig domains	One V domain and one C domain in each chain	Heavy chain: one V domain, three or four C domains Light chain: one V domain and one C domain
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Changes after cellular activation		
Production of secreted form	No	Yes
Isotype switching	No	Yes
Somatic mutations	No	Yes

Element	Immunoglobulin		$\alpha:\beta$ T-cell receptors	
	H	$\kappa + \lambda$	β	α
Variable segments (V)	40	70	52	~70
Diversity segments (D)	25	0	2	0
D segments read in three frames	rarely	–	often	–
Joining segments (J)	6	5(κ) 4(λ)	13	61
Joints with N- and P-nucleotides	2	50% of joints	2	1
Number of V gene pairs	1.9 x 10 ⁶		5.8 x 10 ⁶	
Junctional diversity	~3 x 10 ⁷		~2 x 10 ¹¹	
Total diversity	~5 x 10 ¹³		~10 ¹⁸	

Figure 4-13 Immunobiology, 6/e. (© Garland Science 2005)

Event	Process	Nature of change	Process occurs in:	
			B cells	T cells
V-region assembly	Somatic recombination of DNA	Irreversible	Yes	Yes
Junctional diversity	Imprecise joining, N-sequence insertion in DNA	Irreversible	Yes	Yes
Transcriptional activation	Activation of promoter by proximity to the enhancer	Irreversible but regulated	Yes	Yes
Switch recombination	Somatic recombination of DNA	Irreversible	Yes	No
Somatic hypermutation	DNA point mutation	Irreversible	Yes	No
IgM, IgD expression on surface	Differential splicing of RNA	Reversible, regulated	Yes	No
Membrane vs secreted form	Differential splicing of RNA	Reversible, regulated	Yes	No

Figure 4-25 Immunobiology, 6/e. (© Garland Science 2005)