

構造生物学

12. 免疫系

非自己分子の認識

3つの装置

抗体 (Antibodies)

主要組織適合性複合体 (MHC)

Major Histocompatibility Complex

T細胞受容体 (T-Cell Receptor)

非自己認識機構

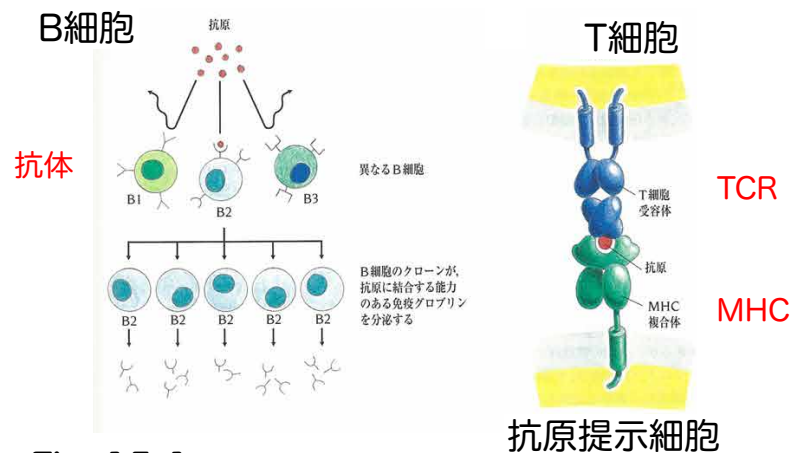
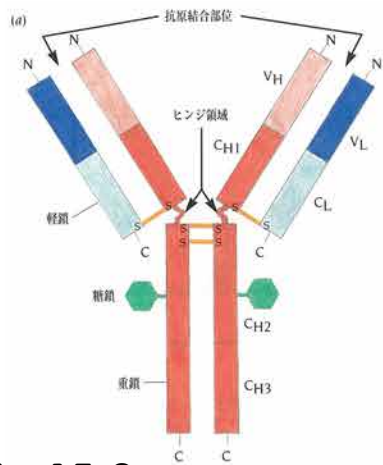


Fig. 15-1

抗体

抗体 (IgGの例)



- 4 量体分子
- 2本の重鎖+2本の軽鎖
- 4つのSS結合
- Igフォールド
- 潰れたβバレル
- 軽鎖に2つ, 重鎖に4つ

Fig. 15-2

抗体の多様性部位

CDR : complementarity determining region

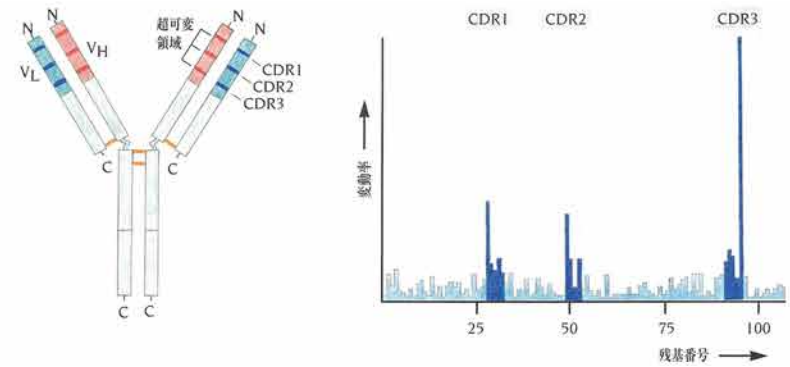


Fig. 15-3

IgGの構造

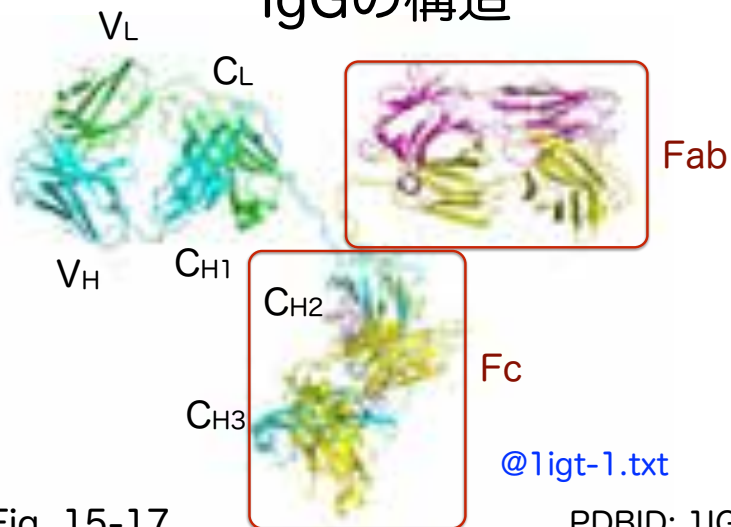


Fig. 15-17

@1igt-1.txt

PDBID: 1IGT

Immunoglobulin Fold

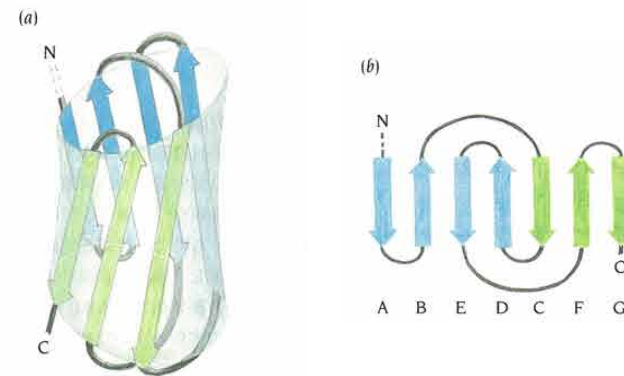
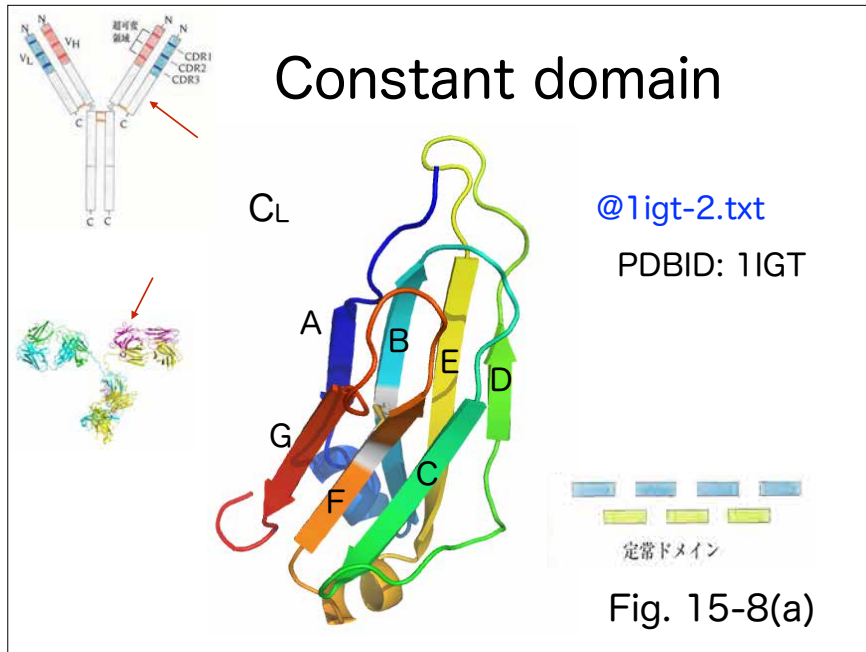
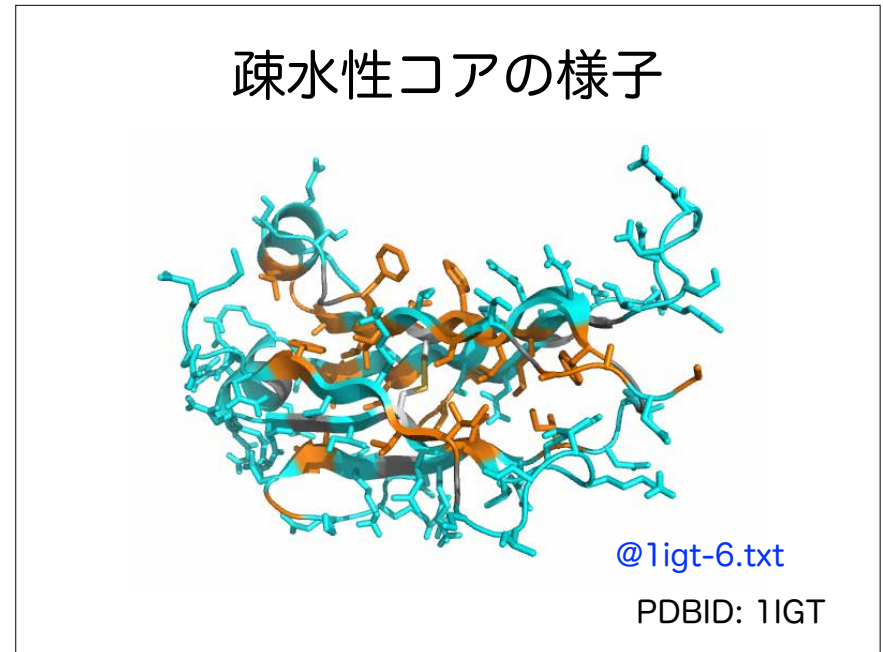


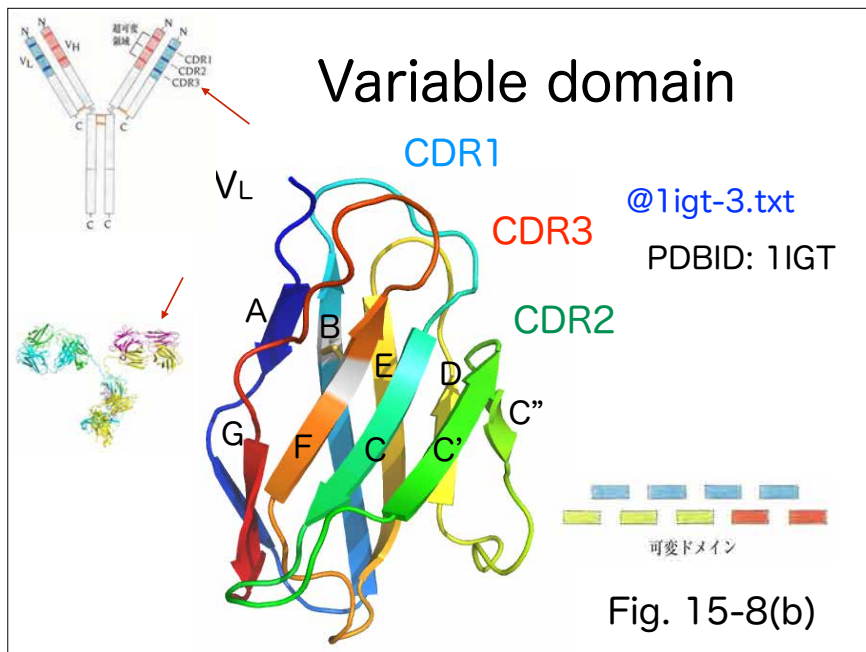
Fig. 15-7



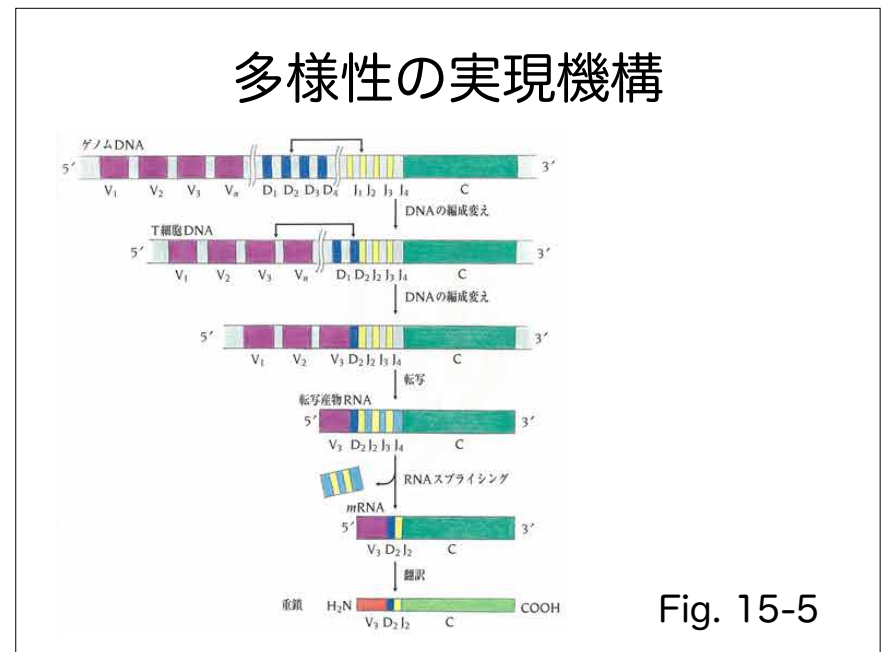
9



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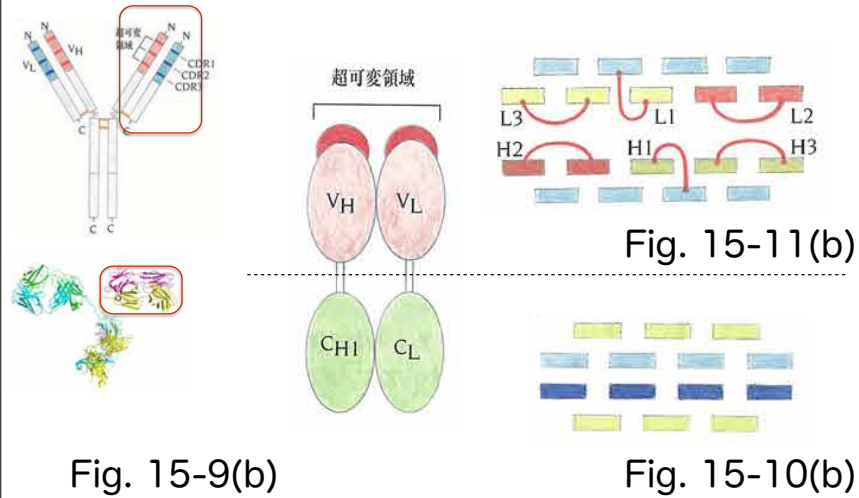


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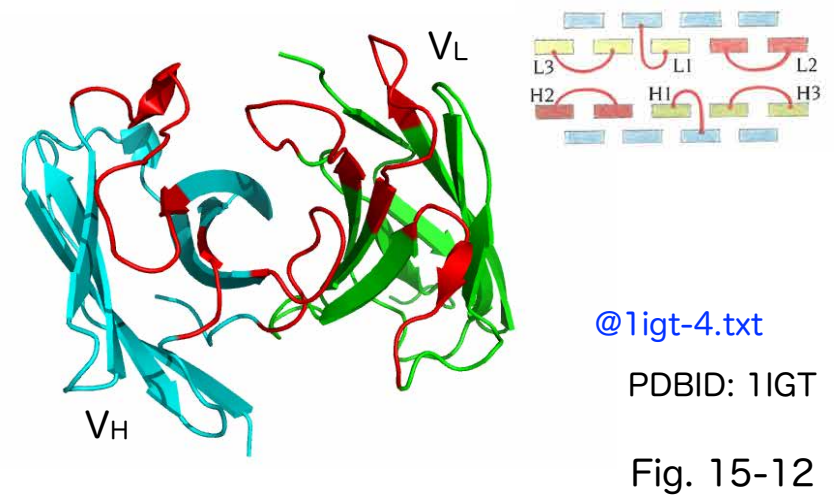
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重鎖と軽鎖の相互作用



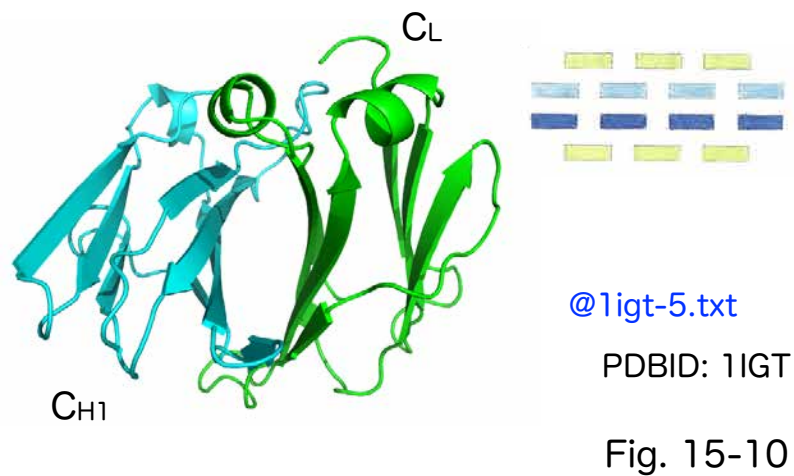
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V_HとV_Lの相互作用



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C_{H1}とC_Lの相互作用

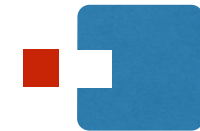


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抗体認識法

脂質や核酸などの低分子

くぼみで認識



蛋白質性の抗原

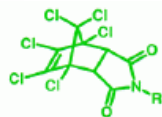
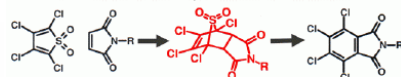
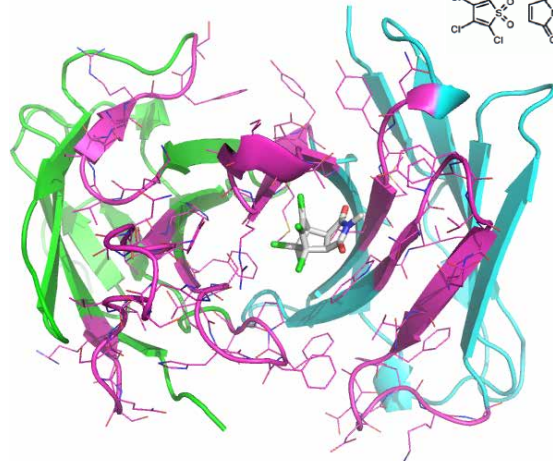
面で認識



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抗体酵素の例

くぼみで認識



@1cle-1.txt

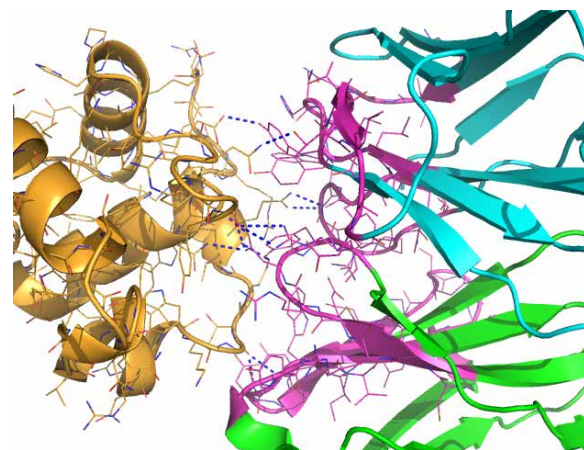
PDBID: 1C1E

Fig. 15-14

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抗リゾチーム抗体の例

面で認識



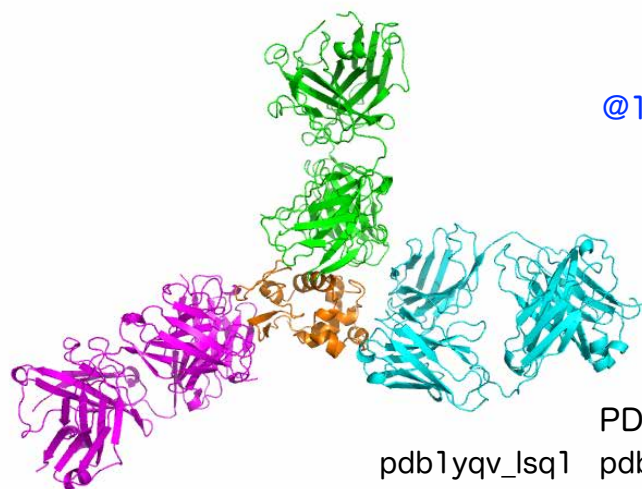
@1fdl-1.txt

PDBID: 1FDL

Fig. 15-15

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抗体の抗原認識の多様性



@1fdl-2.txt

PDBID: 1FDL

pdb1yqv_lsq1

pdb3hfm_lsq1

19

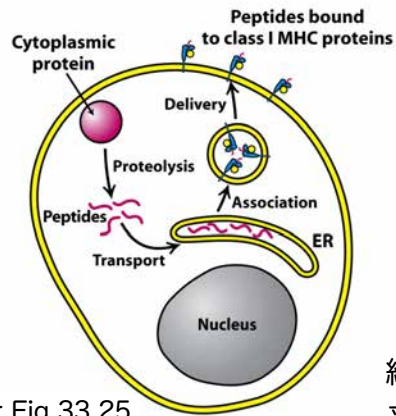
MHC

主要組織適合性複合体

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MHC の働き

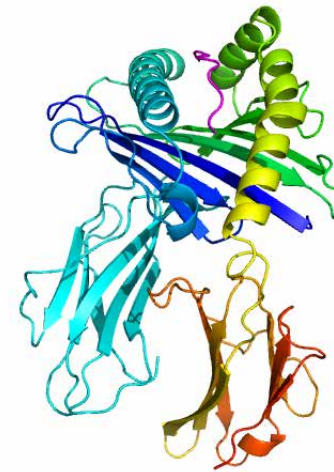
Class I の☒



Stryer Fig 33.25
(第6版)

Class II: ダイマー
細胞内に取り込まれた外
来性抗原を結合して提示

MHC class I

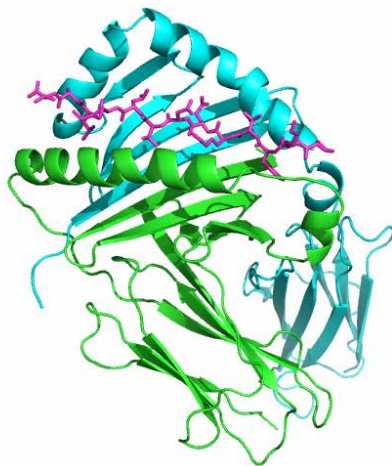


@1hsa-1.txt

PDBID: 1HSA

Fig. 15-18

MHC class II

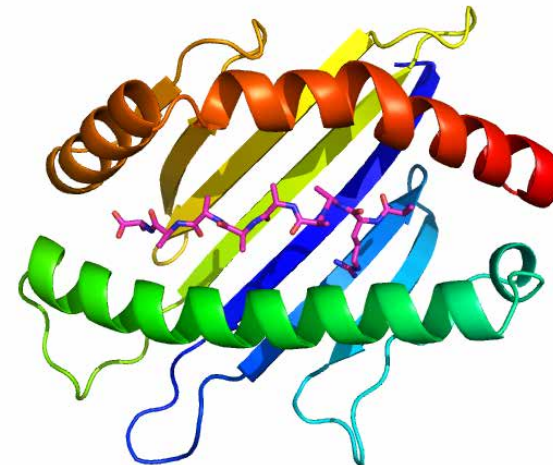


@1dlh-1.txt

PDBID: 1DLH

Fig. 15-18

MHC class I

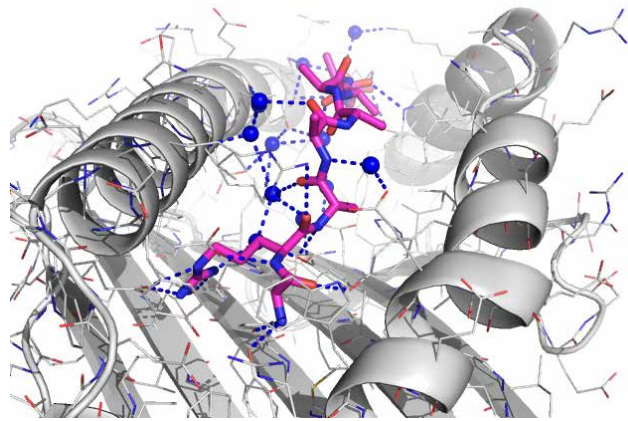


@1hsa-2.txt

PDBID: 1HSA

Fig. 15-19

MHC class I



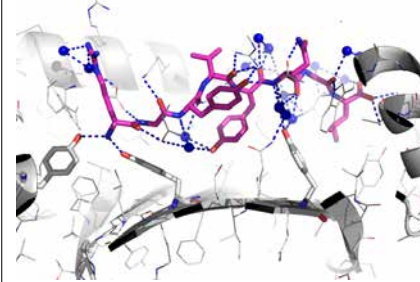
@1hsa-3.txt

PDBID: 1HSA

Fig. 15-20(a)

異なるペプチドの認識

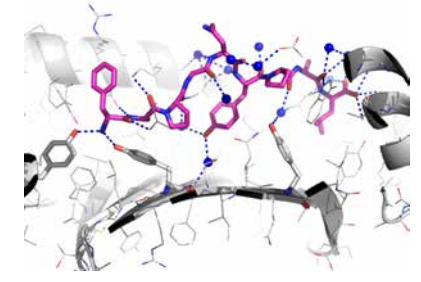
RGYVYQGL



@2vaa-1.txt

PDBID: 2VAA

FAPGNYPAL



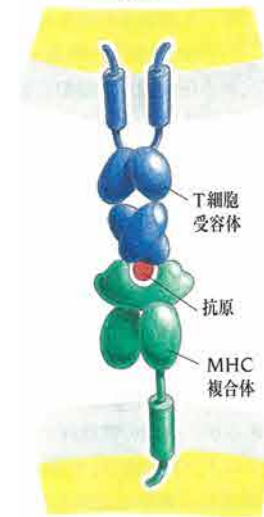
@2vab-1.txt

PDBID: 2VAB

T細胞受容体

T細胞

TCRとMHCの相互作用



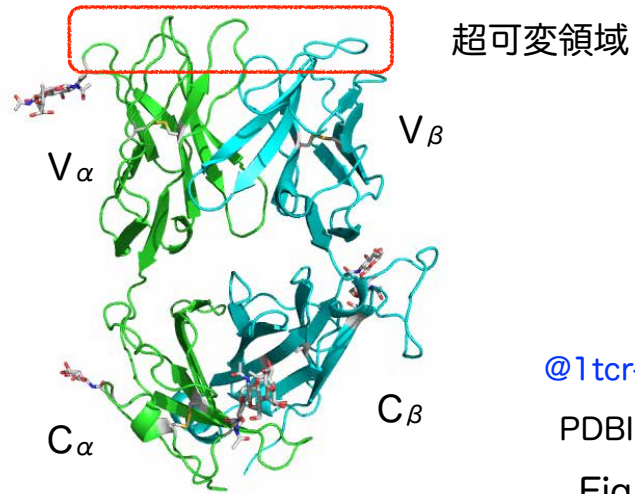
TCR

MHC

抗原提示細胞

Fig. 15-1(b)

T細胞受容体の構造



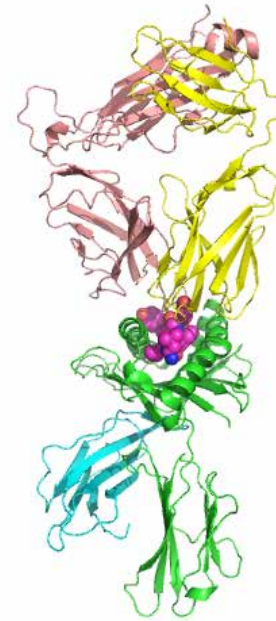
@1tcr-1.txt

PDBID: 1TCR

Fig. 15-22

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MHCとTCRの結合



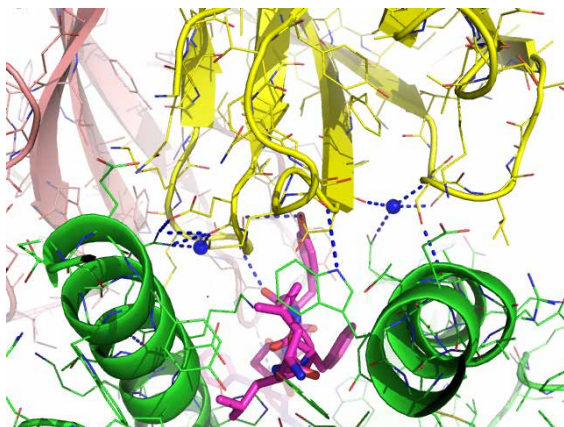
@1bd2-1.txt

PDBID: 1BD2

Fig. 15-23

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TCRの認識の様子



@1bd2-2.txt

PDBID: 1BD2

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課題

膜タンパク質の所で学習したように、抗体分子ないしそのドメインは膜タンパク質の結晶化に利用される。しかし、MHCは利用されることが無い。なぜか？

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