

# درسنامه سازمان جهانی بهداشت

در ارتباط با خون و فرآورده های خونی سالم

# Safe Blood and Blood Products

WHO Distance Learning Material

## انتشارات مرکز تحقیقات سازمان انتقال خون



## درسنامه سازمان جهانی بهداشت

در ارتباط با خون و فرآورده های خونی سالم

مترجمین:

مهدی تبریزی نمینی  
دکتر حسین تیموری نقده  
دکتر مرصده خدیر  
دکتر مریم خیری

دکتر مریم رهبری بناب  
کامبیز کیا دلیری  
عذرا کیا هاشمی  
دکتر مهنوش مهران

زیر نظر:

دکتر احمد قره باغیان

Safe  
Blood  
and  
Blood  
Products



WHO



مرکز تحقیقات

تهیه و تدوین در انتشارات مرکز تحقیقات  
سازمان انتقال خون ایران



مرکز تحقیقات

ISBN 964-6997-89-9



مرکز تحقیقات

www.ibto.ir





**WHO**

# در سنامه سازمان جهانی بهداشت

در ارتباط با خون و فرآورده‌های خونی سالم

مترجمین:

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**ISBN 964-6997-89-9**

**Safe blood and blood products: distance learning :**

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[www.ibto.ir](http://www.ibto.ir)

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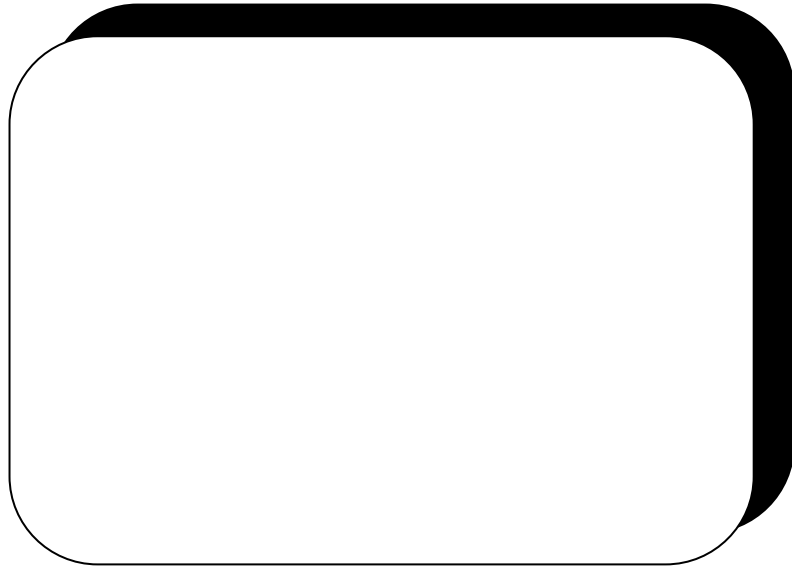
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به نام خدا





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(WHO)

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Specifications for production/Assembly of Basic Laboratory Equipment (WHO/LAB/84.2)

Self-in struction sheets for users of primary Health care Laboratory Equipment (WHO/LAB/85.7)

Calibration and Maintenance of seri-Automated Haematology Equipment (WHO/LBS/92.8)

Maintenance and Repair of Laboratory, Diagnostic Imaging and Hospital Equipment (WHO, 1994)

Calibration and Control of Basic Blood cell counters (WHO/97.2)



(processing)



HIV

(HIV)

HIV



(bench work)

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سازمان آموزش عالی

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**Glossary**





(SOPs) .

**Offprints**

email





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سازمان بهداشت و درمان  
جمهوری اسلامی ایران



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الجمهورية الفلسطينية  
وزارة التعليم والبحث العلمي

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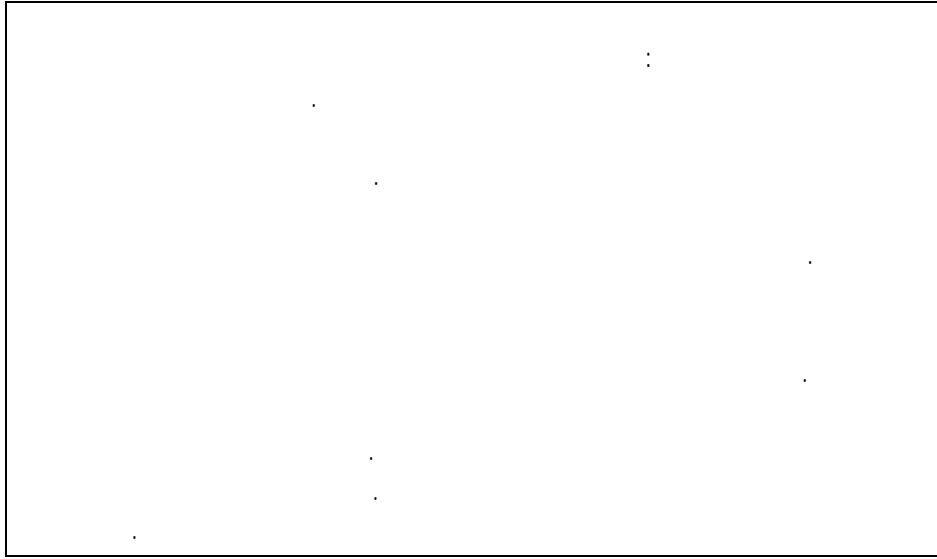


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سازمان بهداشتی درمانی ایران







سازمان آموزش عالی







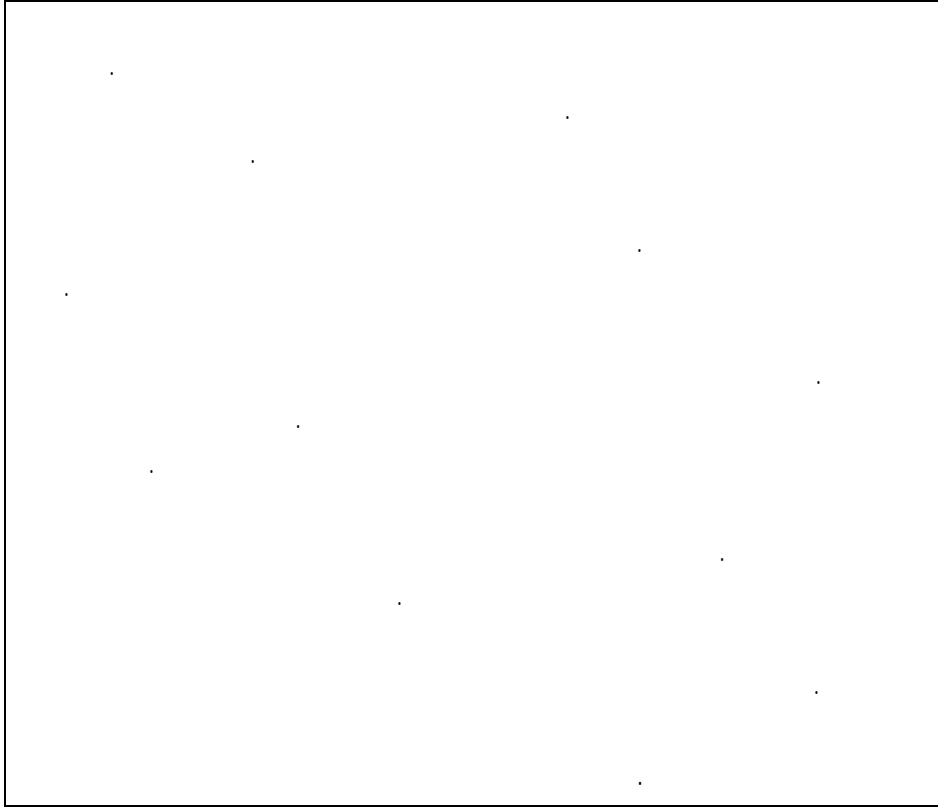
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( AIDS ) "HIV  
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دولة فلسطين  
السلطة الوطنية  
الصحة







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دولة فلسطين  
السلطة الوطنية  
الصحة







سازمان آموزش عالی



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سازمان آموزش عالی



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(SOP)

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سازمان آموزش عالی







**(Quality and Quality Assurance)**

:

Standard operating procedures (SOPs)

record-keeping

Quality monitoring



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"(Quality control)

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"(SOP)

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"(QC)

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**Quality Assurance**

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**Quality Control**

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## Standard Operating Procedures (SOPs)

(SOPs)

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SOP

/SOP ●

/LAB ●

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SOP



SOP

"(QA)

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(from vein to vein)

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(a batch of bags)



سازمان ملی حقوق بشر

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HIV

HIV

(from vein to vein)

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سازمان بهداشتی درمانی ایران

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**(Quality Monitoring)**

(SOPs)

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WHO







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## Responsibility for Quality

Quality Assurance

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(QC)

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(SOPs)

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سازمان آموزش عالی

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FFP

Von Willeberand

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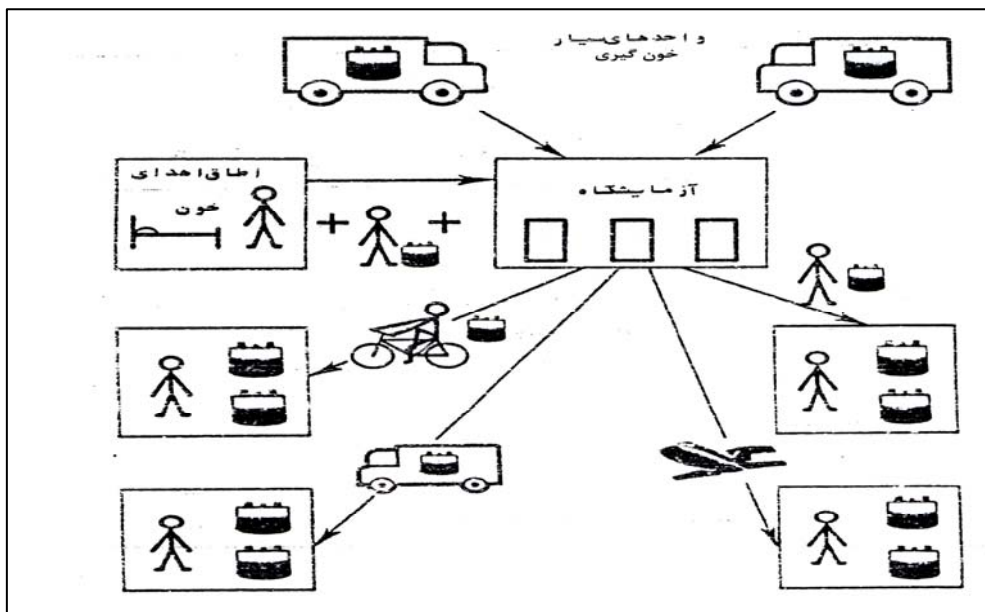
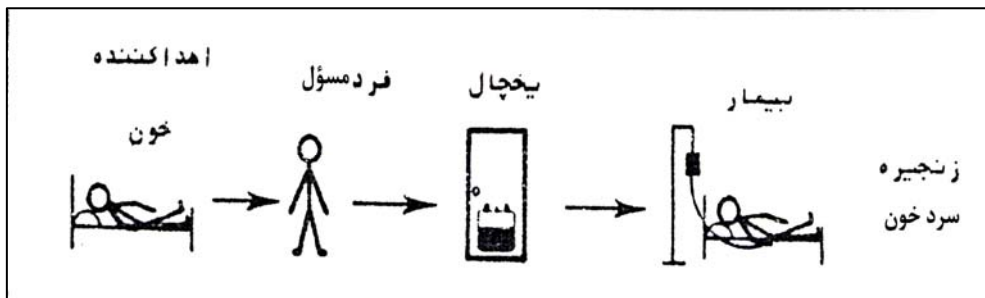
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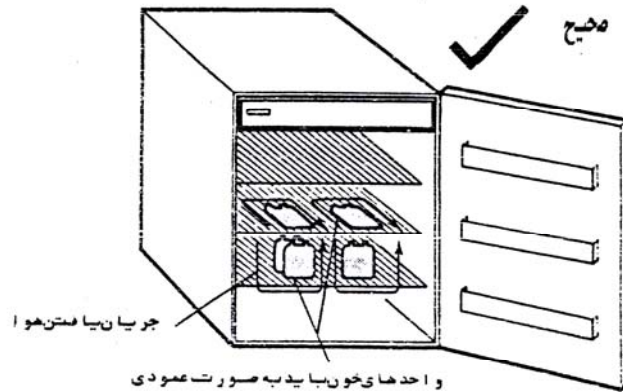
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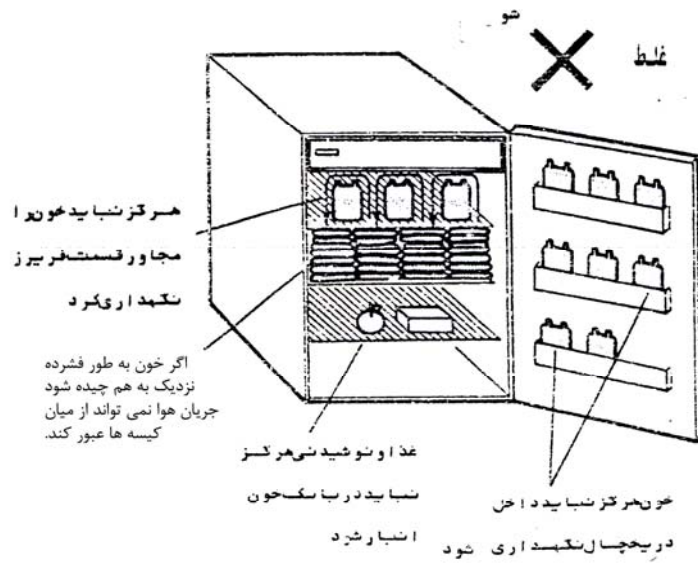
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واحدهای یخونیا بید به صورت عمودی  
در سبدها ایستاده قرار گرفته‌ییا  
به صورت افقی و یقسه‌ها خوابانده



هرگز نیاید خونیا  
مجاور قسمت فریزر  
نکهداری کرد

اگر خون به طور فشرده  
نزدیک به هم چیده شود  
جریان هوا نمی تواند از میان  
کیسه ها عبور کند.

غذا و نوشیدنی هرگز

نیاید در بیا سکون

انبار شد

خونیا هرگز نیاید در اجن

در یخچال نکهداری خود





سازمان آموزش عالی

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الجمهورية الفلسطينية





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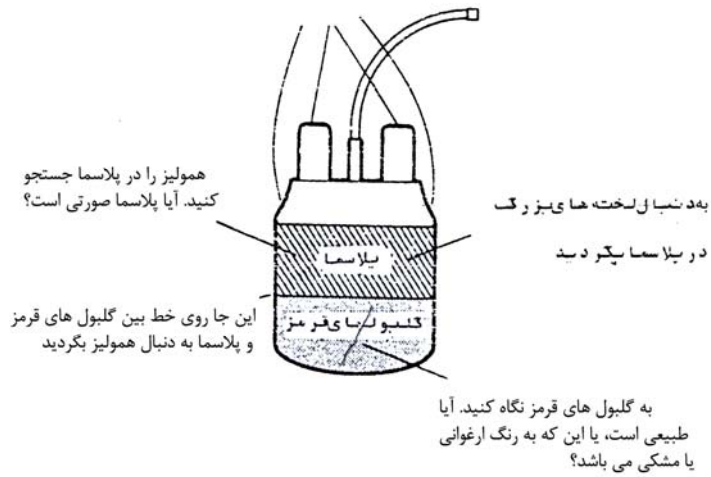
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check list

آیا نشستی و جود دارد؟ آیا شما کیسه را

فشار داده اید؟ اینجار از سنتر و جود

خون بررسی کنید



Styrofoam

(BTI)

BTI

( ) Paper wick

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Email: [www.who.int/bct](http://www.who.int/bct) .

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سازمان بهداشتی درمانی ایران



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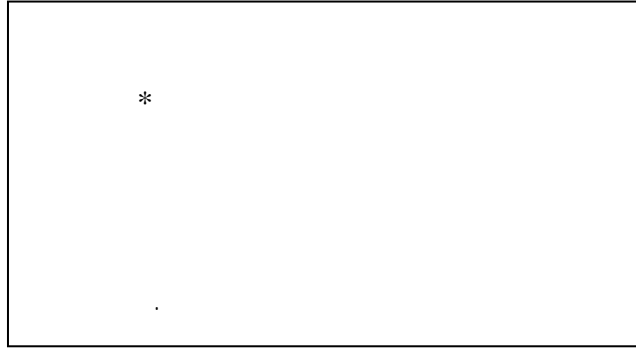
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(SOPs)

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(antiseptic solutions)

(disinfectant solutions)



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### Antiseptic solutions

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### Disinfectant solutions

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AIDS

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AIDA

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(HIV)

(Guidelines on Sterilization and High-Level Disinfection Methods Effective Against Human Immunodeficiency Virus)

HIV

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AIDS

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(Biosafety Guidelines for Diagnostic and Research Laboratories Working with HIV)

(SOP)





(SOP)





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HIV



سازمان بهداشتی درمانی ایران

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**(Ordering Supplies)**

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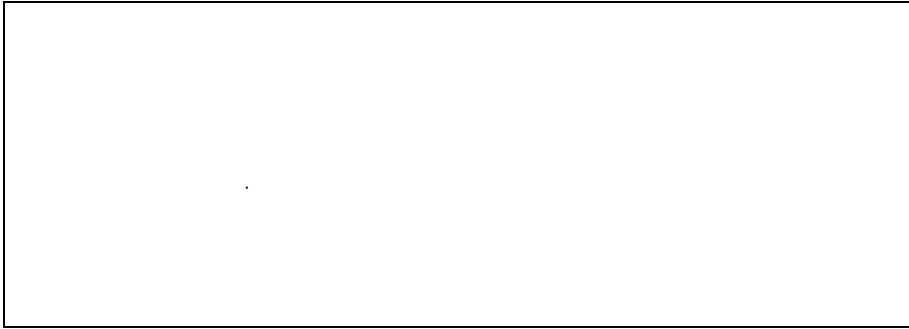
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- Bulk orders
- Standing orders
- Orders as required

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سازمان بهداشتی، درمانی و رفاهی



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سازمان بهداشتی درمانی ایران

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(Supervisor)

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سازمان بهداشت و درمان  
جمهوری اسلامی ایران

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سازمان آموزش عالی و تحقیقات علمی



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self-deferral  
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الجمهورية الفلسطينية  
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سازمان بهداشت و درمان  
جمهوری اسلامی ایران





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الجمعية الوطنية لحقوق الإنسان

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**SOP/BTS/LAB/009/01**

DAT/BTS/RL/003

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**SOP/BTS/LAB/010/01**

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(WHO/BTS)

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سازمان آموزش عالی

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(self-deferral)

(self-exclusion)



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HIV

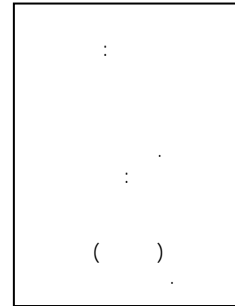
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**(Family or Family Replacement Donors)**



(directed donation) «                    »  
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(WHO)

In Minimum Targets for Blood Transfusion Services (WHO.1989)

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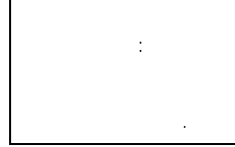
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(commercial or professional donors)



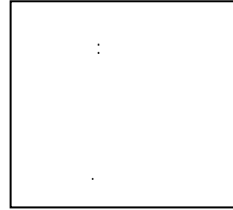
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**(Voluntary non-remunerated donors)**

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(contracting)

(low-risk donors)

(alloimmunization)

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(Therapeutic phlebotomy)

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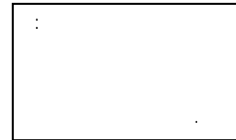
(Autologous transfusion)

(alloimmunization)



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infectious disease markers



HIV

AIDS HIV





HIV ) HIV HIV  
HIV ( )  
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(blood rituals) . body-piercing

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**(Risk behaviour)**

HIV

(HIV )

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AIDS

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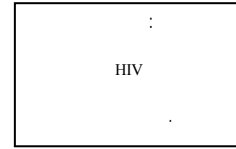
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HIV

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(window period)



(anti-HIV) HIV

HIV

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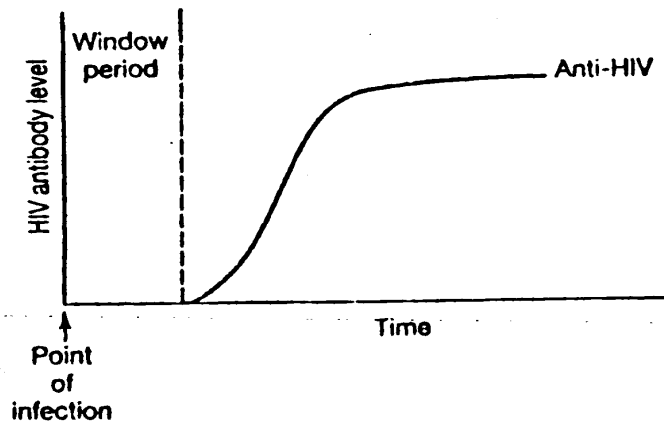
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HIV

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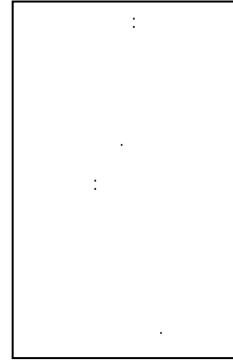


**(Seroprevalence)**

HIV (epidemiology)

(seroprevalence)

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(seroprevalence)





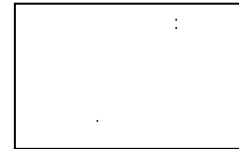
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HIV

HIV

$$\frac{\text{HIV}}{\text{HIV}} * = \text{HIV}$$

HIV



HIV



HIV

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HIV

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HIV(incidence)

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(window period)

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HIV

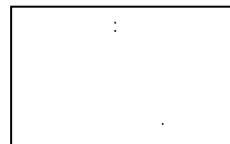
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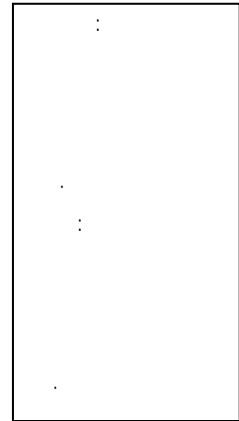


(regular donors)

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HIV  
(window period)

HIV

AIDS

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(AIDS )

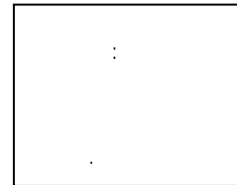


(Peer group pressure) « »

(confidential unit «

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exclusion)



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HIV  
(HIV )

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HIV



HIV





سازمان بهداشت و درمان  
جمهوری اسلامی ایران



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سازمان بهداشت و درمان  
جمهوری اسلامی ایران





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سازمان آموزش عالی

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سازمان آموزش عالی

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slide projector

flip charts  
/over head projector  
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(Pre-test)

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( B HIV )





سازمان بهداشت و درمان  
جمهوری اسلامی ایران

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AIDS

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سازمان بهداشت و درمان  
جمهوری اسلامی ایران

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سازمان آموزش عالی







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الجمهورية الفلسطينية  
وزارة التعليم والبحث العلمي

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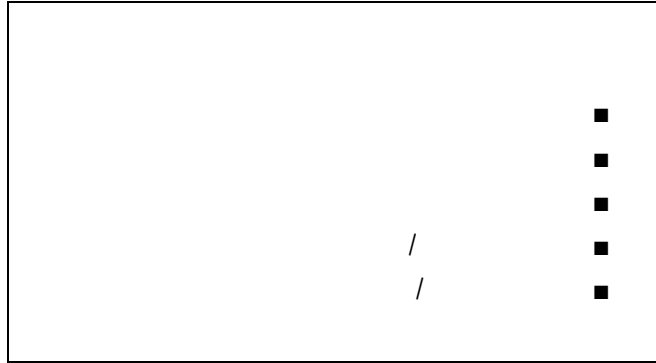
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سازمان بهداشتی درمانی ایران







سازمان بهداشتی درمانی ایران

+ °C + °C



(needle .

stick)

+ °C

(supercooled ice)

+ °C

( / )

+ °C + °C

(CPD )



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(WHO)

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(blood collection sets)

cuff

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سازمان آموزش عالی

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[Redacted]

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[Redacted]



سازمان بهداشتی درمانی  
جمهوری اسلامی ایران



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سازمان بهداشتی، درمانی و رفاه اجتماعی

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HIV ) (



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HIV « »

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HIV





سازمان آموزش عالی



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(STD/VD)

HIV AIDS

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(monitoring)

(HIV )



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الجمهورية الفلسطينية  
وزارة التعليم والبحث العلمي

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**Professional**

(SOPs)





سازمان بهداشتی درمانی ایران



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دولة فلسطين  
السلطة الوطنية  
الصحية



(low risk)





**(Venepuncture)**



سازمان بهداشت و درمان



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HIV )

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HIV

HIV

HIV

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HIV



HIV

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HIV

HIV

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) (WHO)

HIV

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WHO



(SOPs)







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سازمان آموزش عالی



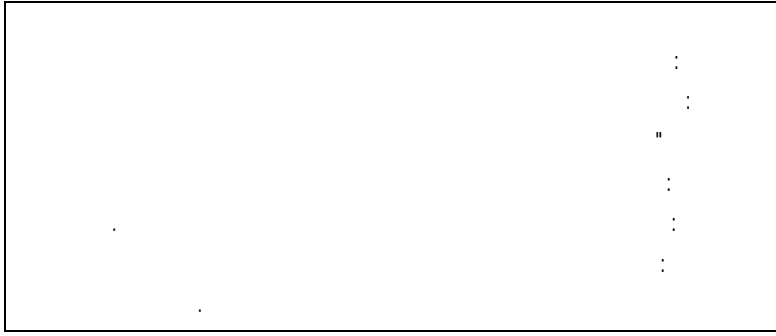
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Rh-AB      Rh-B      Rh-O

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سازمان آموزش عالی



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(HIV )



(Window Period)





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(WHO) ) (

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سازمان بهداشتی درمانی ایران



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[Redacted]

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سازمان آموزش عالی



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سازمان آموزش عالی

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HIV

B HIV  
HIV

**(Lapsed)**

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: Lapsed donor

HIV





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(RhD ABO)

HIV



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سازمان بهداشت و درمان  
جمهوری اسلامی ایران



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الجمهورية الفلسطينية  
وزارة التعليم والبحث العلمي





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## HIV (seroprevalence)

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HIV

HIV

HIV







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سازمان آموزش عالی





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سازمان آموزش عالی





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الجمهورية الفلسطينية  
وزارة التعليم والبحث العلمي

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سازمان بهداشتی درمانی ایران

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سازمان بهداشتی درمانی ایران







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HIV

HIV

HIV





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HIV



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سازمان بهداشتی درمانی ایران



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(Alloimmunization)

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**(Incidence)**

**(self-deferral)**



(self-exclusion)

(seroprevalence)

( )  
HIV



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| SOP/BTS/CLN/001/01   |                     |                |              |
|----------------------|---------------------|----------------|--------------|
| SOP                  |                     |                |              |
|                      |                     |                | BTS          |
|                      | SOP                 | BTS            |              |
|                      |                     | :              |              |
|                      |                     | .              | SOP          |
|                      |                     |                | SOP          |
|                      | /                   | /              |              |
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|                      |                     | %              | % / Hibitane |
| (SOP/BTS/CLN/002/01) |                     |                |              |
| Author: John Smith   | df: SOP Hb Scr. Rtf | date: 01/06/01 | Page : 10f2  |



SOP/BTS/CLN/001/01

a  
b  
c  
d  
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f  
g

a  
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) SOP/BTS/CLN/002/01 :

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(SOP/BTS/CLN/002/01) .



SOP/BTS/CLN/002/01

SOP

SOP

BTS

BTS

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SOP

SOP

cc

EDTA

( ) Sphygmomanometer

(FRM/BTS/CLN/002)

(SOP/BTS/CLN/003/01)

(SOP/BTS/CLN/004/01)

(SOP/BTS/CLN/005/01) "bevel up"

EDTA

.(SOP/BTS/CLN/003/01)



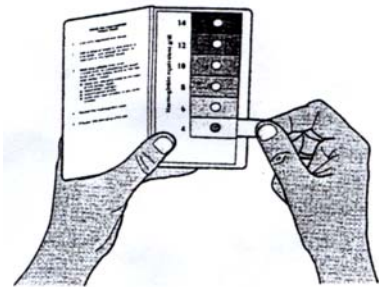
(SOP/BTS/CLN/004/01)  
(SOP/BTS/CLN/005/01) "bevel up" cc  
EDTA  
(FRM/BTS/CLN/002)  
BTS

Author: John Smith      df: SOP Hb Scr. rtf      Date: 01/06/01      Page : 20f2



|    |  |           |
|----|--|-----------|
| 14 |  | Too light |
| 12 |  | Too light |
| 10 |  | Correct   |
| 8  |  | Too dark  |
| 6  |  | Too dark  |
| 4  |  | Too dark  |

( gr/dl gr/dl gr/dl gr/dl gr/dl )



gr/dl

% / % /





CH-1211 Geneva 27, Switzerland  
Fax: +41 22 791 4836  
E-mail: [hbcoursesale@who.int](mailto:hbcoursesale@who.int)



AIDS

AIDS

AIDS

HIV

HIV

HIV

HIV

AIDS HIV

(STD)

HIV

HIV

B ( ) HIV

HIV

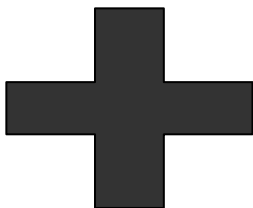
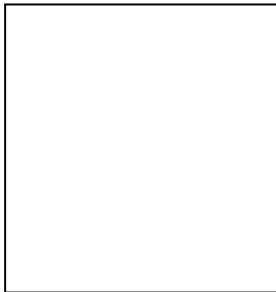
HIV



HIV

HIV

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22 Gorrie Shreet  
Suva, Fiji  
Phone: 314133

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(check list)

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(refreshments)





HIV ( )

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C/S copper sulfate LINIC/SOP/3 :

(copper proteinate) (sac)

(hesitate)

(Slyke) (Phillips)

(, Clinic / SOP/4)

|   |       |
|---|-------|
| / | CuSo4 |
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|      |           |
|------|-----------|
| LM : | 20.9.93 : |
|      | 20.1.94 : |

per lub/sop/23

/ / : ( )  
/ / : ( )

/ (specific gravity = SG) :  
/ (SG) :

\*(Autoclix)

% % / Hibitane :  
( )

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] Clinic/sop/4  
[.

Clinic/sop/4 :

(C/S)

(gr/dl)

(g/L)

SI

C



sequestrene tube ( ) cc

(ball point)  
( ) sphygmomanometer

( )

.( Clinic/sop/11)

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( Clinic/sop/13)

sequestrene

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« c/s»

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headquarter donors ( )

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جمهوری اسلامی ایران

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C

AABB Technical Manual  
WHO Technical Report Series 786, 1989





الجمعية الوطنية لحقوق الإنسان  
National Society for Human Rights



( )

(lbs ) :

cc

/

/

cc



ORh

ORh

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(gr/dl) / :

(gr/dl) / :

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(mm/Hg) :

(mm/Hg) :

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: A  
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HIV

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C B

HIV

HIV

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( )

(concussion)

Dengue

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HIV

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Glandular

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( )

:( ) A

B

C

(cold sores)

HIV

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(Meniere's disease)

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( )

(Pyelitis)

( ) (renal colic)

HIV



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HIV

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cm\* cm  
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mm/Hg

( / ml) %

cm

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cm



(seal)





سازمان آموزش عالی





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cc



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cc

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الجمهورية الفلسطينية  
وزارة التعليم والبحث العلمي

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**(Hyperventilation)**

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**HIV**

(HIV)

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HIV

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.(WHO/BTS)

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HIV



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Glossary

Offprints

. (TTIS)

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HIV

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HIV



HIV :

:

.

.(TTIS)

(Seropositive) (TTIS)

:

:

AIDS

HIV :

HIV

:

(TTIS)

:

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## HIV

(HIV )

٦

(SOPs)

(QA)

(QA)

:

(Chagas disease)

HTLV I-II C

B

٥٦

HIV

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HIV



٥

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- ١
- ٢
- ٣
- ٤

(٤ )

٦



## HIV

|     | ( ) |  |
|-----|-----|--|
|     |     |  |
| HIV |     |  |
| ٤   |     |  |
| ٥   |     |  |
| ٦   |     |  |
|     |     |  |
|     |     |  |



HIV





# HIV

|      | (٥ ) |  |  |  |
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|      |      |  |  |  |
|      |      |  |  |  |
| ٤    |      |  |  |  |
| ٥    |      |  |  |  |
| ٦    |      |  |  |  |
| (QA) |      |  |  |  |
|      |      |  |  |  |
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HIV



HIV



« »



## HIV

:



:

(Latency)

:

(Viruses)

(Bacteria)

(Protozoa)

(Fungi)



:

HIV



( )

(Prion)

( )

(virions)

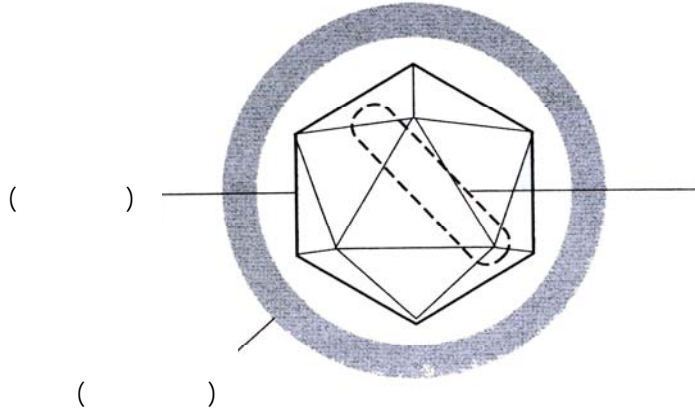
( ) RNA ( ) DNA :

-  
-  
-  
-



# HIV

(Core)



(HIV)

A

B

C

( ) Varicella Zoster

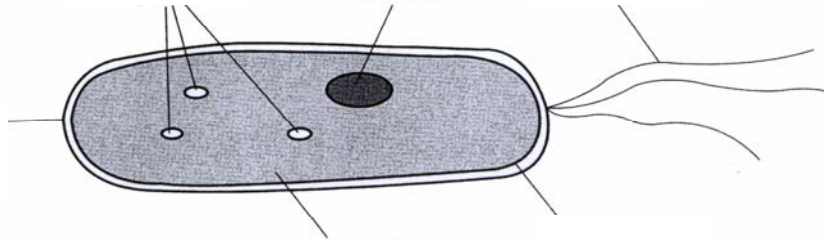
(Latency)

( )

: Latency -

( )

( ) (Nucleus)



) (

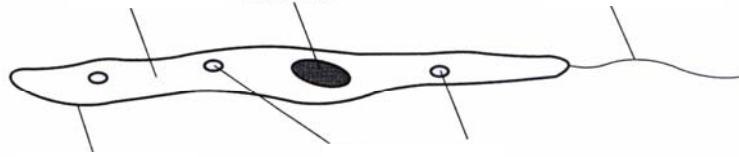
- (Syphilis) : (Treponema Pallidum)
- (Cholera) : (Vibrio Cholerae)
- (Tetanus) : (Clostridium tetanii)

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DNA : -







:

(Mycelia)

(Spores)

(Moulds)

(Yeasts)

( )

:

(Ringworm infections of the skin)

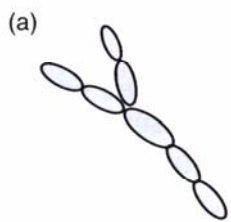
:(Tinea)

(Candidiasis)

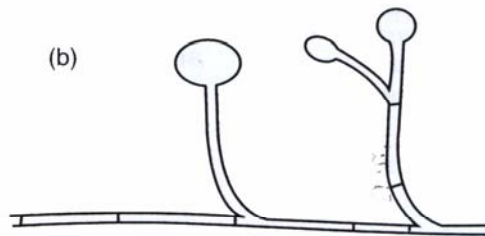
:(Candida)

(Histoplasmosis)

:(Histoplasma)



Budding yeast cells



Mycelia - branched filamentous fungi

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HIV

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HIV



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(Antigen= Ag)

(Antibody= Ab)



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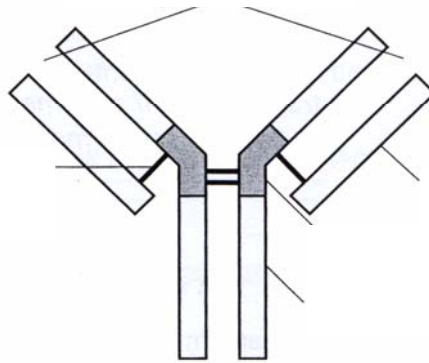
# HIV

(Lymphoid Cells)

(Gammaglobulins)

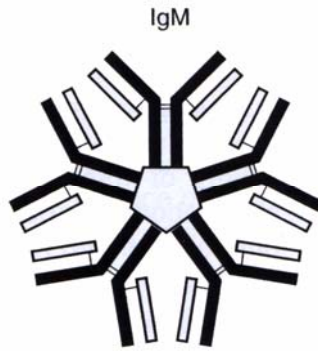
(Immunoglobulins)

(Y) (Heavy Chain) " °  
(Light Chain) " °  
(Y) ( ° )  
( ° )  
.IgE IgD IgA IgM IgG : (Ig)

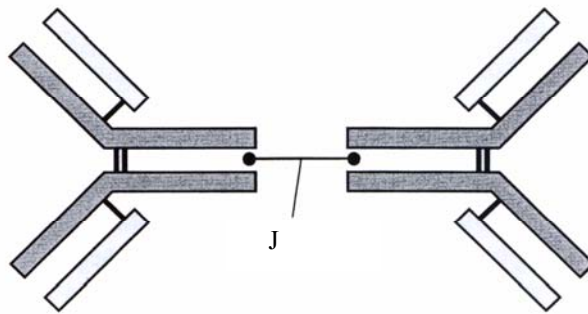


IgG : ۵ %  
IgG  
% IgM ( ۰ )  
IgM . IgG  
IgA . ( ۶ )  
IgA . %  
« j »

( )



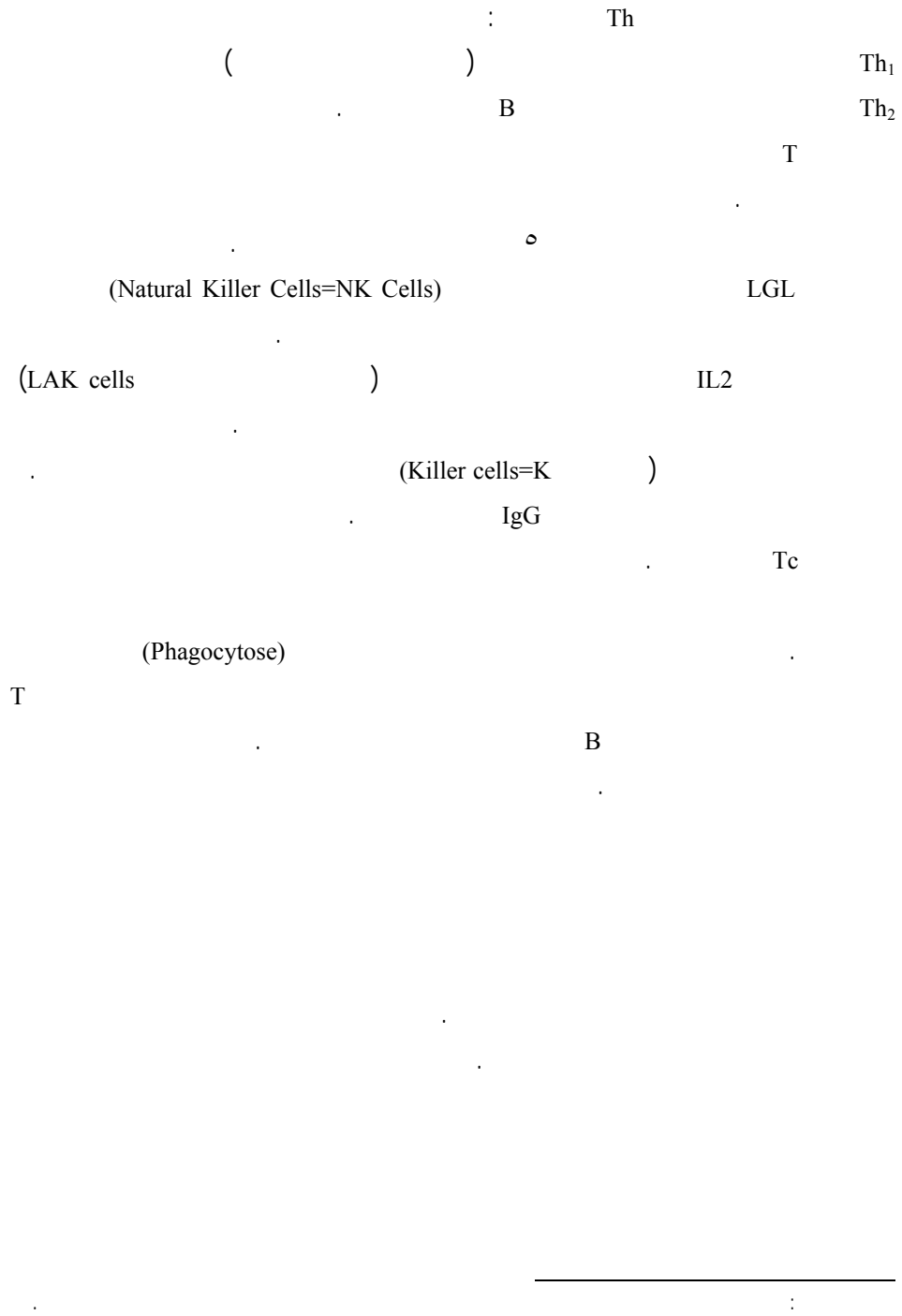
IgM : ۶



IgA :



HIV





## HIV

( )

"

( A )

"

"

"

(Dormant)

(Markers of infection)

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:Dormant



HIV



(immunity)

٤

٦

"

(HBsAg)  
HIV

B  
( )  
(HCV) C



:



HIV

HBV

HBsAg  
(HBsAb) HBsAg

HCV HIV

(Anti-HCV) HCV (Anti-HIV) HIV

HCV

HIV

:

( )

HIV



:



(latency)



(latency)



HIV

**(The Human Immunodeficiency Viruses=HIV)**

HIV

(AIDS)

HIV



HIV

HIV

AIDS

HIV

HIV

**HIV**

HIV

AIDS

HIV

(HIV-1)

HIV

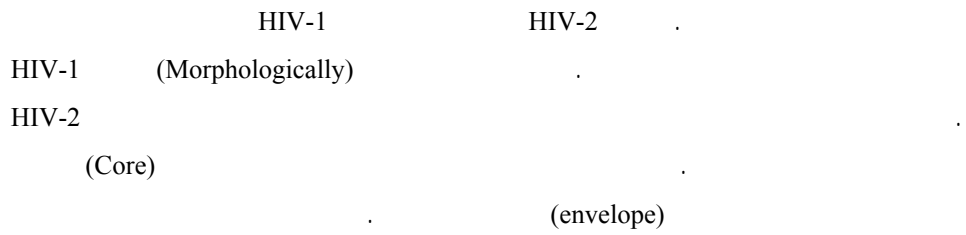
HIV-2

HIV

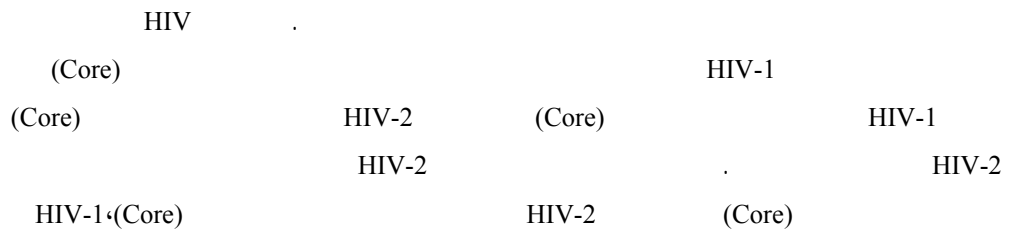
٦

AIDS

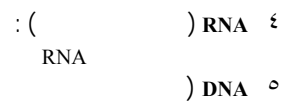
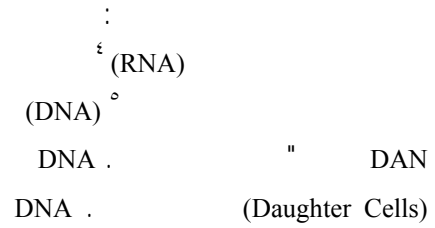
# HIV



## (Cross- reactivity)

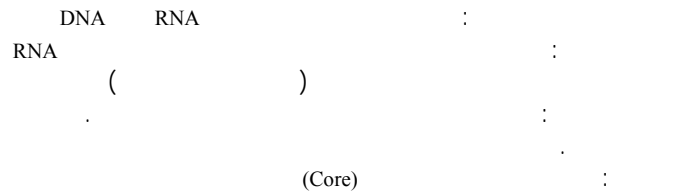
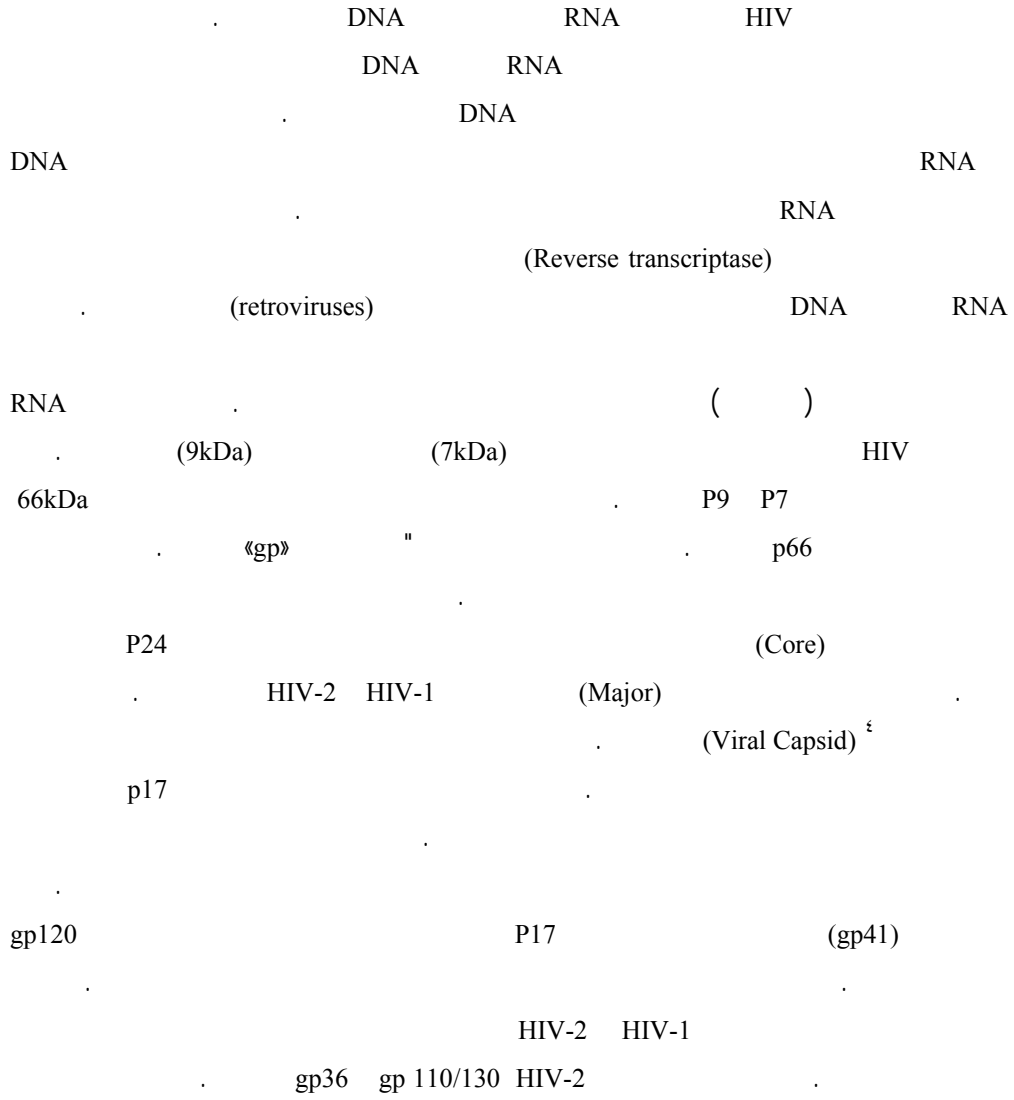


## HIV





# HIV

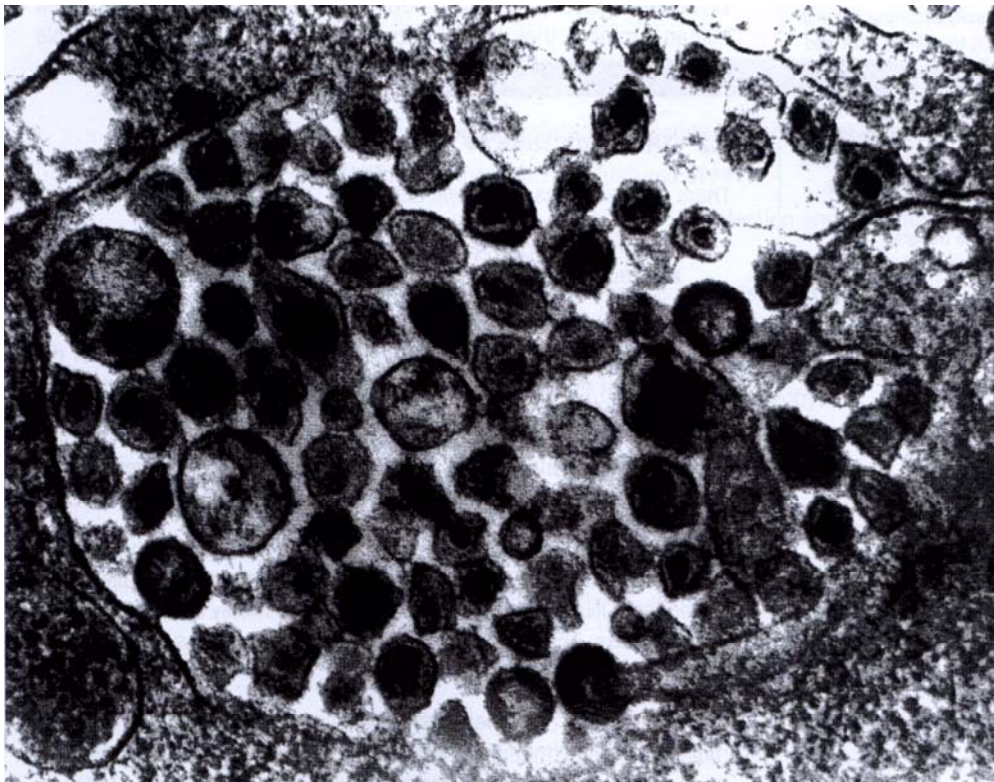


HIV



HIV-1

o



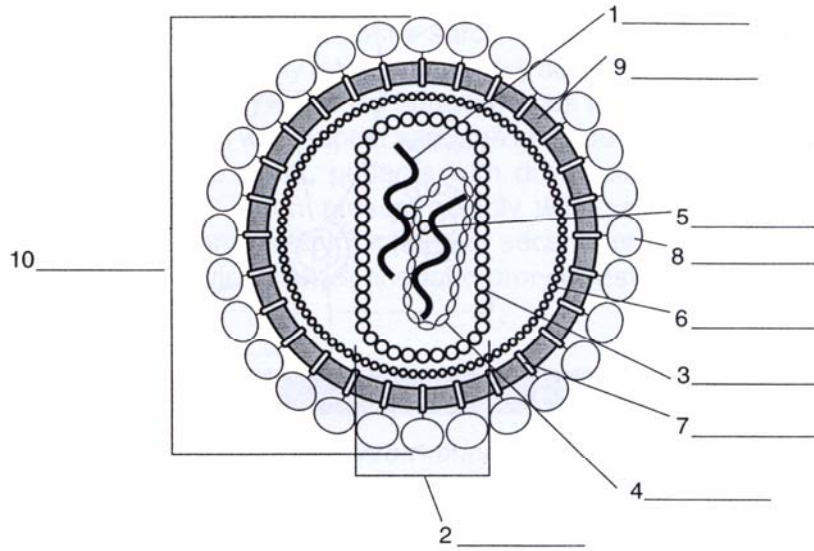
CD4

HIV

:



# HIV



HIV :



HIV

(CD4 )

HIV

CD4 .

(T cells) T

(T helper cells= Th cells) T

RNA

DNA

DNA



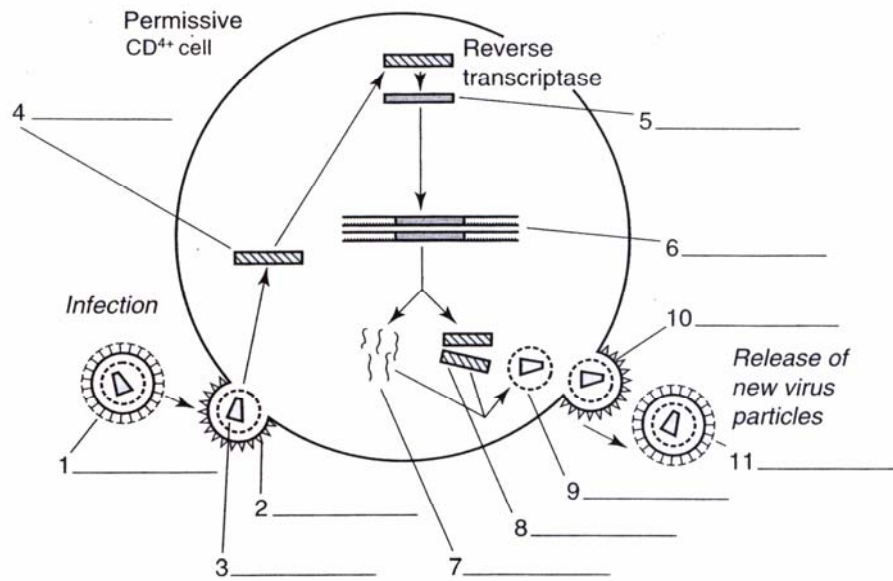
HIV



(latent) DNA (integrates) DNA

( )

(HIV)



HIV :

(Genome)

HIV

gp 120/160 gp41 p24

HIV .

CD4

: integration

:



# HIV



HIV

AIDS HIV

AIDS HIV

HIV

(Opportunistic infections)

(Pneumocystis Carinii)

(Mycobacterium Tuberculosis)

(Mycobacterium Avium/ Intracellularis)

(Chronic Cryptosporidiosis)

(Toxoplasmosis)

(Cytomegalovirus)

(Kaposi Sarcoma)

(non-Hodgkin)

"

(non-Hodgkin lymphoma)

"

)

"

(

HHV<sub>8</sub>

(AIDS Related Complex= ARC) ARC





: AIDS HIV  
AIDS HIV (Prevalence)

AIDS HIV  
AIDS

)  
(

o (Incidence)  
AIDS

AIDS

HIV  
AIDS HIV

HIV

(Surrogate testing)

(NANB) NON-A, NON-B

(anti-HCV) C



:  
:



**HIV**

anti-HBC

( ) ALT (B )

NANB

HIV

HIV

( )

anti HIV

anti-HIV

"

(Seroconversion)

RNA

(P<sub>24</sub>)

HIV

RNA



HIV

:

RNA

HIV

RNA



:

HIV



RNA

DNA

(P24)

RNA

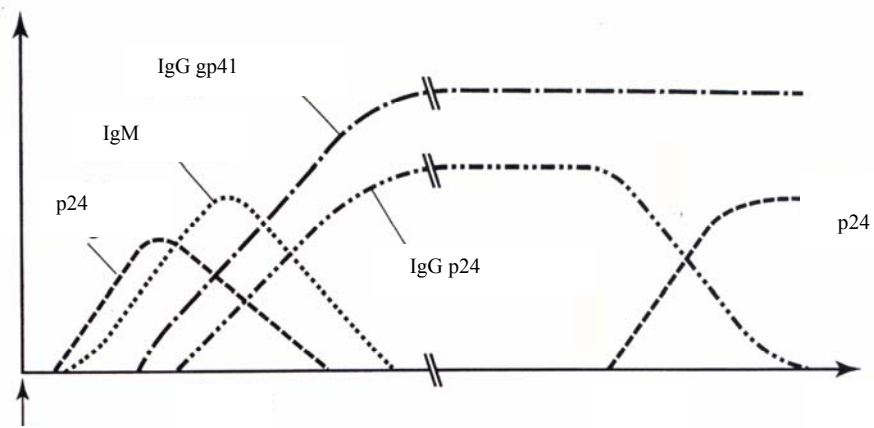
DNA

HIV

HIV

HIV

P<sub>24</sub>



HIV



HIV

anti-p24

(ARC)

p24

HIV

HIV

HIV

HIV

AIDS

AIDS

HIV

HIV

HIV

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( )

HIV (

AIDS HIV

HIV

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⋮

HIV



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HIV

HIV

HIV

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HIV

(Heterosexual Transmission)

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( )

:(protective)



HIV

( )

HIV

HIV

HIV

(WHO)

HIV

HIV

HIV

HIV

anti- HIV

HIV

HIV

AIDS

HIV

( )

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HIV



HIV

HIV

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HIV

" HIV

HIV

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HIV

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HIV

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(bisexual)

(

ε

anti-HIV

HIV

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:bisexual

HIV



HIV

"

HIV

HIV

AIDS

HIV

HIV

" gp 120/160 gp41 p24  
HIV.  
CD4 "

HIV

HIV

HIV %

: " HIV



HIV

HIV

HIV



HIV

HIV

HIV



ξ

HIV

HIV

AIDS

HIV

HIV

ξ

HIV



HIV



HIV

TTIs

"

HIV

HIV

anti-HIV



HIV

HIV

anti-HIV

Enzyme Linked Immunosorbent Assays (ELISA)

Particle agglutination assays

Simple rapid assays

EIA

ELISA

٤

(TTIS)

EIA

HIV



/  
 (Indicator) ( / )

:  
 Positive/negative /  
 reactive/non-reactive « » / « »  
 equivocal

indeterminate

« » .

) « »  
 (  
 « » « »



\_\_\_\_\_



## HIV

### Enzyme Immuno Assays 4

EIA

EIA

EIA

(micro well)

EIA

EIA

Solid

EIA

Solid

EIA

Solid

( )

( )



**HIV**



EIA : EIA - ۱

EIA : EIA - ۲

EIA : EIA - ۳

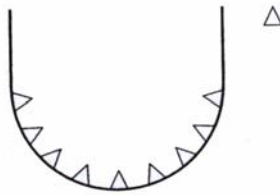
EIA : EIA - ۴  
(IgG)

(HIV : ) EIA :

(anti-HIV immunoassays)

( )

anti-HIV  
(microwell)



:





# HIV

٦  $\xi^{\circ}C$

)  $\xi^{\circ}C$

(

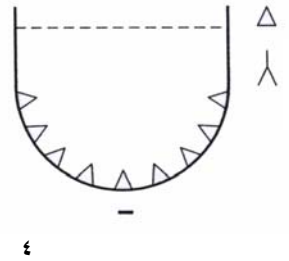
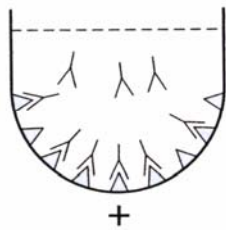
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( )

(

$\xi^{\circ}C$

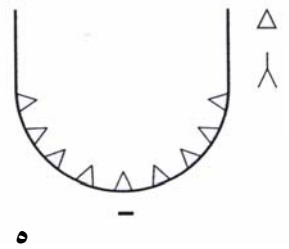
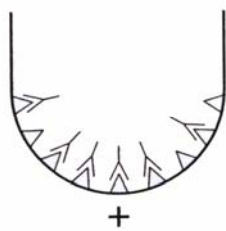
(  $\xi$  )



( HIV )

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( ٥ )



( HIV )

HIV



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(

PH

-۵

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(

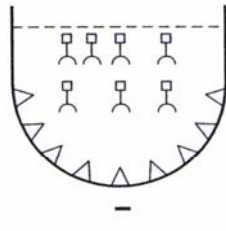
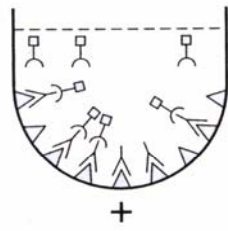
(Horseradish Peroxidase)

IgG

( ٦ )



# HIV



Δ HIV  
 ( )  
 ( )

+

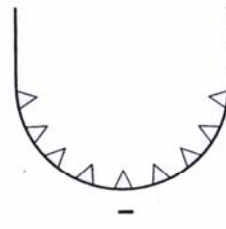
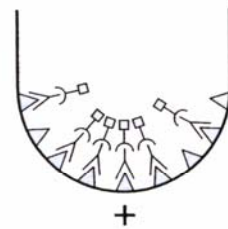
-

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( )

ε



Δ HIV  
 ( )  
 ( )

+

-

)

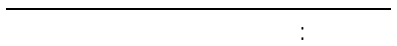
-٧

( °c

(Chromogen)

EIA

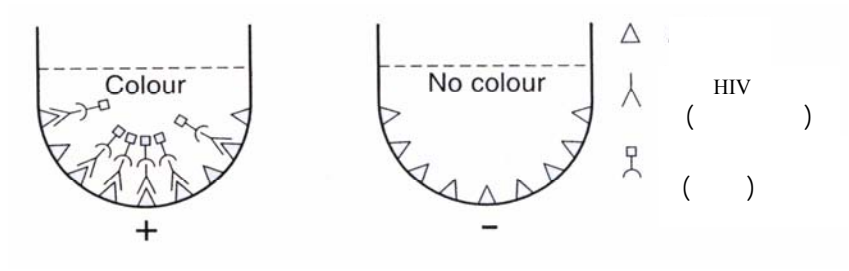
(line assay)



HIV



)  
 ) ( )  
 ) ( )



-8

(OD ) Optical densities -9

(HIV ) EIA :  
 EIA EIA



# HIV

EIA

)

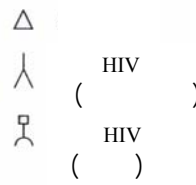
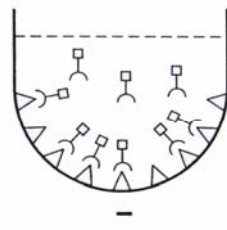
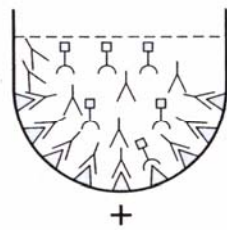
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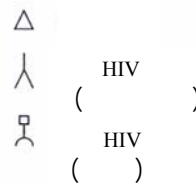
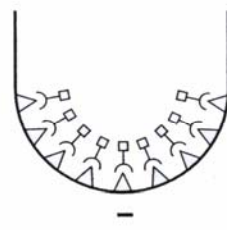
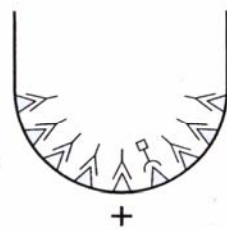
-۳

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-۴

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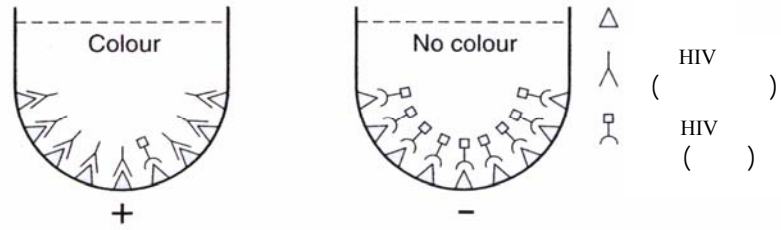
HIV



( ٥٥ )

-٥

( ) .



-٦

(OD )

-٧

(HBsAg : HIV ) EIA :

HBs HIV

EIA

EIA

(HIV )

)

(

:(synthetic)



# HIV

EIA )

IgG

( )

(

« »

EIA

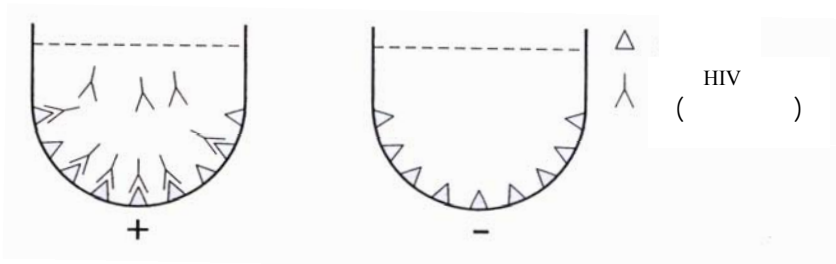
)

-1

(

-2

( )



-3

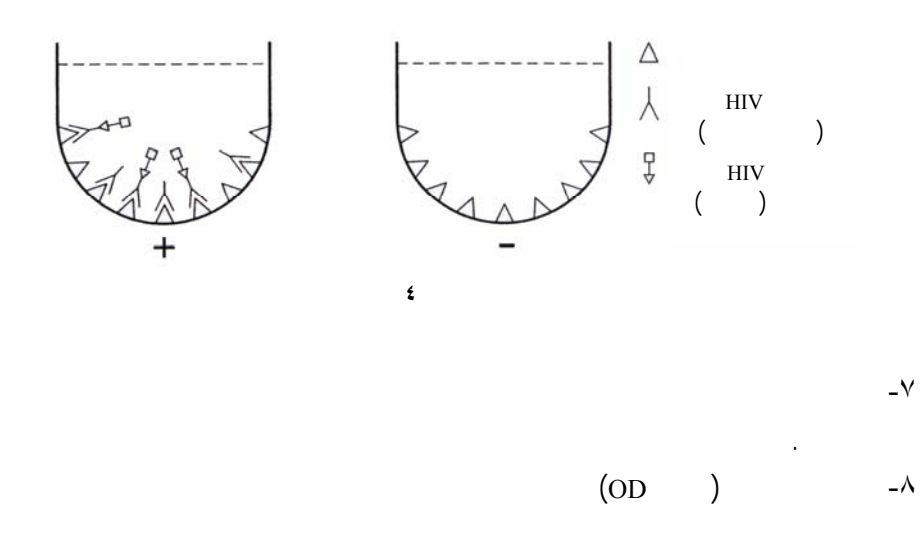
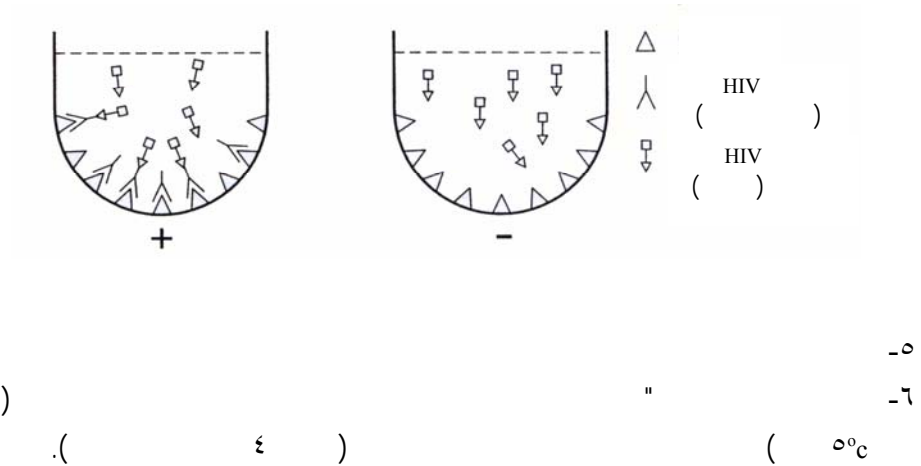
-4

)

(



HIV



(b)  
 EIA (HBsAg) EIA  
 :  
 ( )



# HIV

EIA

)

(

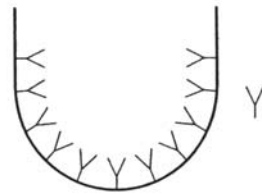
(

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EIA

o

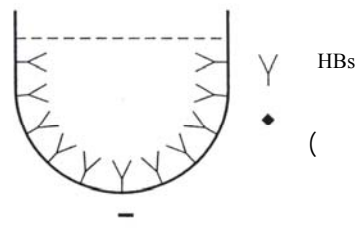
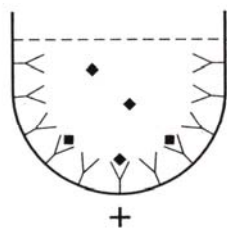
-)



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-)

( ٦ )



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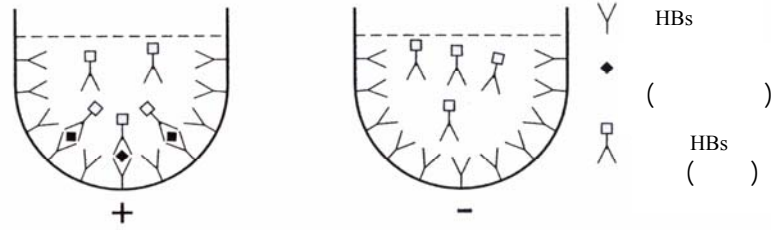
HIV



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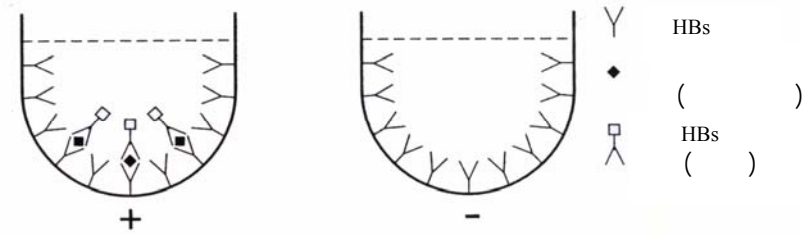
-۵

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( )

( °C



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(OD )

-۸



## HIV

(HIV : )

) Antibody capture EIA :  
Antibody capture EIA

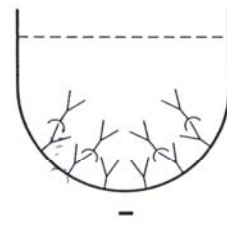
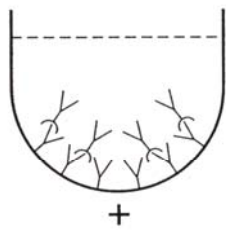
(anti-IgG, IgM, IgA)

EIA

)  
EIA (

( )

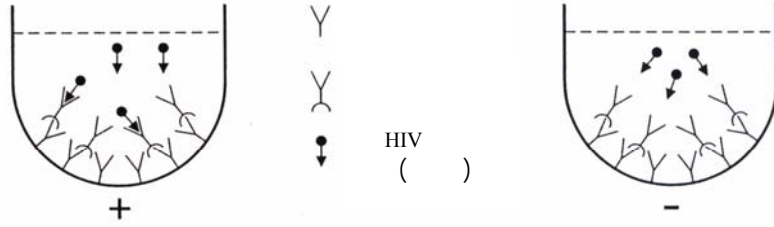
( )



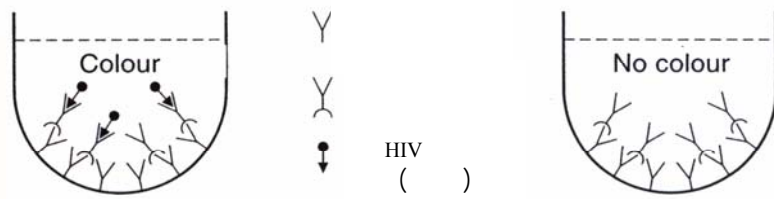
# HIV



( )



( )





HIV

( )

( ) EIA

tip

tip

**Chemiluminescent**

EIA

Chemiluminescent

Chemiluminescent

**HIV**



Chemiluminescent

(microplate )

EIA

**Blots/Line assays**

line assays Western blots

line assays Blots

line assays blot

nylon nitrocellulose

EIA blots

**Western blots**

western blots

western blots

)

(



# HIV

- ۴ - ۴

HIV / EIA

HIV EIA

HIV

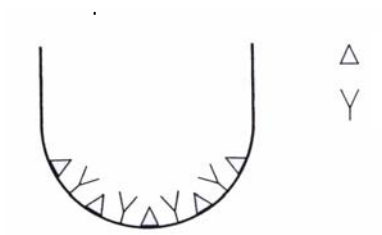
EIA

p24

( )

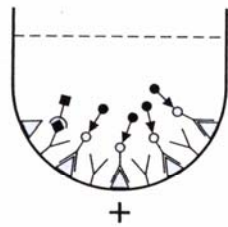
HIV

p26

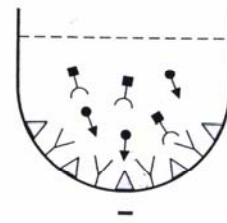


/

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- Δ
- Y
- HIV ( )
- HIV ( )
- HIV ( )
- HIV ( )
- HIV ( )





HIV



HIV

p24

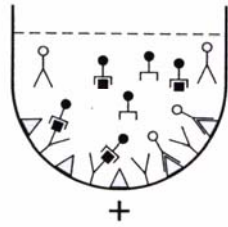
p24

) p24

p24

( ( ε ) )

(



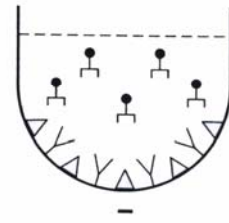
HIV

( )

HIV

( )

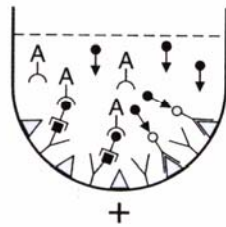
p24



( ( ° ) )

anti-24

anti-HIV p24



HIV

( )

HIV

( )

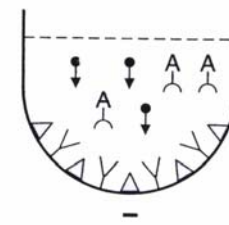
p24

HIV

( )

( )

( )





Optical densities and cut-off values

OD

)

EIA

OD

(

(OD ) EIA

anti- HIV

)

(

OD

EIA

OD ( )

« » (reactive) « »

cut-off

( ) EIA « » ( ) EIA ( ) EIA

) OD « » ( ) OD

« » cut-off « » (

« » OD ( ) EIA

« » ( ) OD

« » cut-off « » cut-off





# HIV

$\frac{OD}{cut-off}$  « »  $\frac{OD}{cut-off}$   
 « »  
 cut-off OD  
 cut-off



$\frac{OD}{cut-off}$   $\frac{OD}{B}$  ( / )  
 (ratio) OD

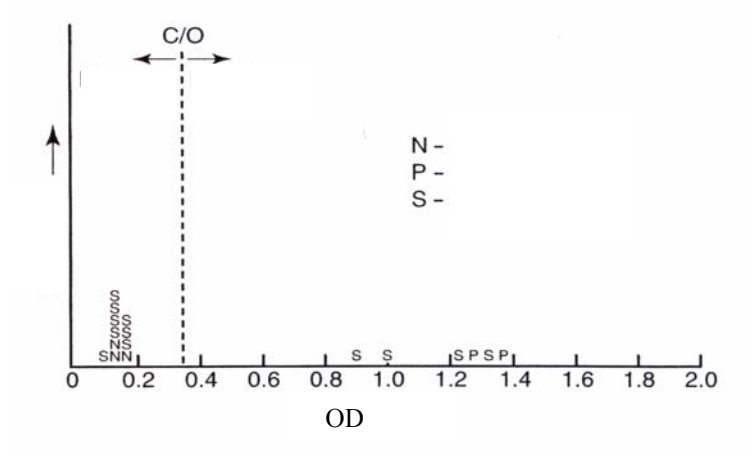
OD signal/cut-off cut-off  
 « »  
 EIA « »  
 ( OD cut-off ) cut-off/signal



$\frac{OD}{cut-off}$   $\frac{OD}{C}$   
 signal/cut-off  
 cut-off  
 ( ) ( )

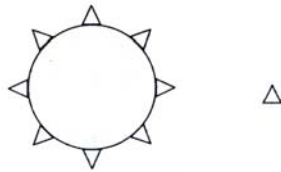
- 1 -

anti-HIV  
 HIV-Ag HIV



)  
EIA  
« »

)  
EIA  
(a)  
-)  
( )

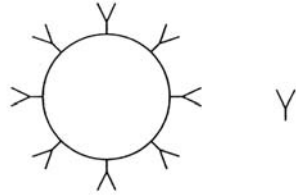




HIV

: (b)  
-۲

.( ) EIA



-۳

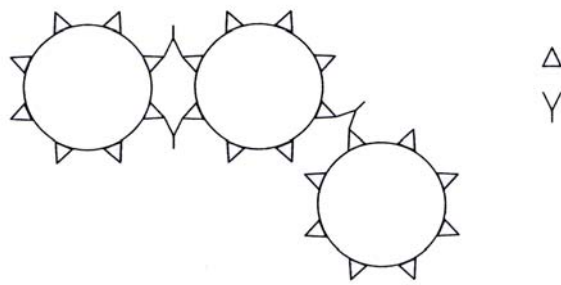
o )  
/o /o

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)

(

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HIV



( )

- ۴ - ۶

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(HCV HIV )

(HBsAg )

( )

( )



## HIV

Immunochemical  
Immunofiltration  
EIA

**Immunochemical**  
immunochemical

(HCV HIV ) **Immunochemical**

-١

-٢

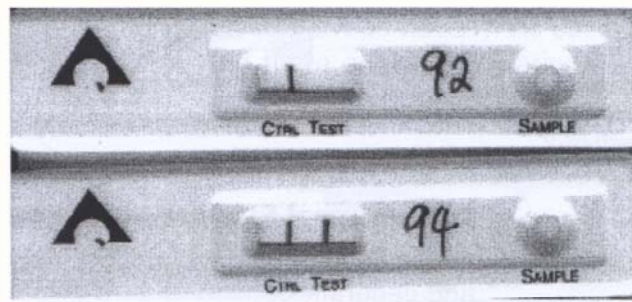
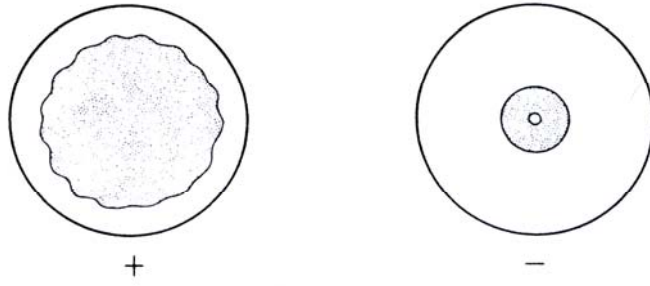
-٣

-٤

(٤ )



HIV



Control test

HCV

immuno chromatographic

(4

**Immunofiltration**

immunofiltration

/

**Immunofiltration**



HIV

( )

A

bacterium staphylococcus aureus

A

IgG

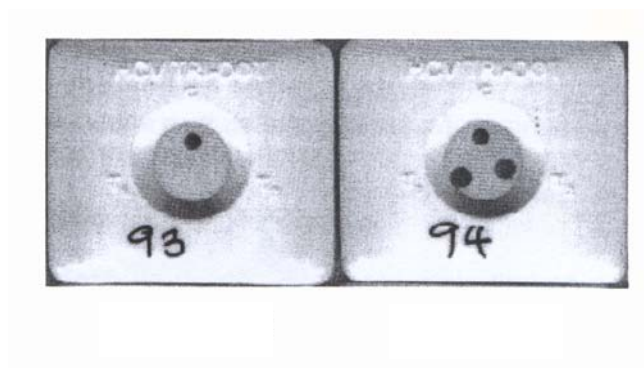
Fc

A

IgG

A

(ξ )



HCV

immunofiltration

(ξ

EIA

EIA

( )



(HCV HIV ) EIA

-۱

-۲

-۳

IgG

EIA

-۴

-۵

A

A  
IgG

-۶

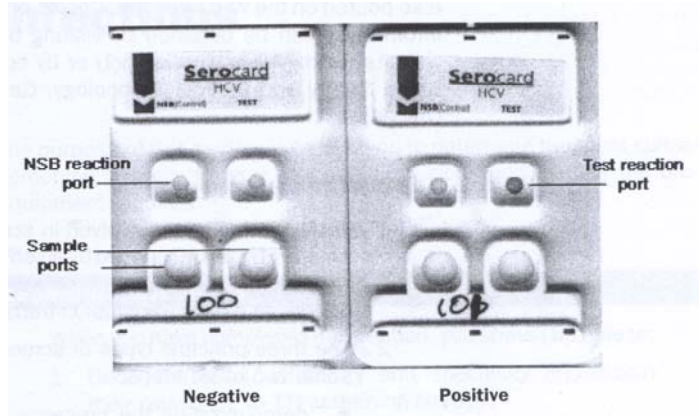
-۷

EIA

(۴۴ ) .



# HIV



EIA

HCV

:

(

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-1

-2

-3

-4

o

TTI

HIV



WHO .

HBV HCV HIV

WHO

WHO

WHO

BCT

<http://www.who.int/bct>

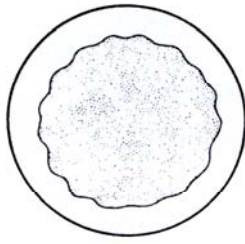
WHO

« » :

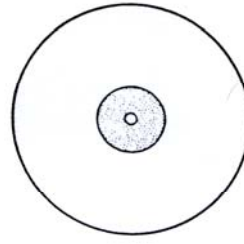
« » .

.( ξ )

(settle method) « »



+



-



## HIV

« »

« » « »

« »

« »

( EIA )

« » « »

OD

### (Simple Rapid Assays)

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HIV-Ag

EIA

anti-HIV

HIV

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( )

HIV



)

(

-۱

HIV

anti-HIV

-۲

-۳

-۴

) IgG

(

EIA

A

)

anti-HIV

(

A

IgG

(

) FU

(IgG

) anti-HIV

A

A

«

»

OD

EIA



HIV

HIV

TTI

:  
( ) /  
(indicator) /



« » « »

۴

۵





:

«            » «            » -۱

TTI

-۲

-۳

-۴

۵



# HIV

TTI

|   |          |          |     |
|---|----------|----------|-----|
|   | +        | -        |     |
| + | <b>a</b> | <b>b</b> | a+b |
| - | <b>c</b> | <b>d</b> | c+d |
|   | a+c      | b+d      |     |

« »

: (Sensitivity)

»

: (Specificity)

«

:

$$(\%) = \frac{a}{(a+c)} *$$

$$(\%) = \frac{d}{(b+d)} *$$

« »

: (Sensitivity)

: (Specificity)



« ..... »  
)

.(

« ..... » « ..... »

« ..... »

« ..... »

( ..... )



HIV

)

(

(<sup>o</sup> )

$$* \frac{a}{(a+c)} =$$

$$* \frac{d}{(b+d)} =$$



( )





HIV

EIA

EIA

TTI

EIA

HIV



٥

TTI

TTI

(suitability)

(QC)

( )

TTI



HIV

(

) TTI

TTI



TTIs

:

TTIs

TTI

)

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HIV



( )



EIA

( )



HIV

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.(

EIA

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## HIV

anti- HIV

%

%

( )

(ordering schedule)

) .

(

( )

HIV



:  
°C



HIV

TTI

)

(

TTI



٦

٦

°C

HIV



(Lipoemic)

TTI

(QC)

( )

(Sodium azide)

$\xi^{\circ}\text{C}$

)



HIV

EIA

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(

(

( )



TTI

TTIs

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TTI

(

ε



HIV



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(

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HIV

EIA





HIV

TTI

( )

« »  
« »

-1

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-3

-4

-5

-6

TTI

-7

-8



6





HIV

TTI

( TTI )

( )



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TTI

HIV



٦

(error log)

:

(operator)



(error log)

**(Handling screening results)**

« »



## HIV

« »

EIA

TTI

« »

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TTI

" "

TTI

TTI

TTI

TTI

(predictive value)

(reference)

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:



(QC)

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« »

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- ۵
- ۶

( EIA )



(reference)

( )



## HIV

TTI

) TTI

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(

« »

EIA

(Blot Western)

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(

anti- HIV

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) «( WHO) HIV

(

(pathologic)

-1

-2

-3

(seal)

HIV



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- ۵

(Cardice)

( 7°C )



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HIV

TTI (Q.A)

( ) OD EIA .

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TTI

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( TTI ) .

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HIV

TTI

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TTI

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HIV

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TTI

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TTI

anti-HIV

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HIV

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HIV

WHO

AIDS )HIV

Biosafety Guidelines for Diagnostic and Research Laboratories (

Working with HIV (WHO AIDS series. No9.1991)

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TTI

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TTI



HIV

(Assay components)



TTI

( )

Azide

Azide

( )

HIV



» WHO  
AIDS ) « HIV

(

(Biosafety Guidelines for Diagnostic and Research Laboratories Working with HIV  
(WHO AIDS Series, No. 9, 1991).



HIV

EIA

**(Fluid Waste)**

EIA

**(Solid Waste)**



-۱

« » -۲

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TTI

TTI -۵

-۶



TTI



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TTI -۱

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HIV

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TTI

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TTI



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- ۱

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(SOPs)

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TTI

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(SOPs)

(QC)

(QA)



HIV

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BTS

(QA)

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(product number) - ۵

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(packs) - ۱۳



## HIV

(SOPs)

(SOPs)

(SOP)

EIA

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:

(SOPs)

(issuing the results)

(SOPs)

(SOPs)



(SOP)

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SOP

SOP

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(SOP)

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(SOP)

(SOP)

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(EIA

anti-HIV

(SOPs)

(SOP)

(SOP)

« »



HIV



SOP



(SOPs)

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(SOPs)

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ﺉ

(SOPs)

(SOPs)

(SOPs)

(SOP)

(SOP)

(SOPs)

**(Laboratory Worksheets)**

ﺉ

(Q/A)



HIV

) "Laboratory Checklist"

(



**(Audit Trails)**

(SOPs)

(Q/A)

)

(

HIV



٤

(Q/A)

(SOPs)



HIV

[Redacted]

( ) ٥

(SOPs)

٦

[Redacted]

(SOPs)



HIV



:

(HBV) B  
(HCV) C  
(HTLV I+ II) II, I Tcell  
( )  
( )  
(Chagas disease)

( )

« »

( )



HIV



HTLV/I,II HCV HBV

B

DNA

B

( )

:

B

/ /

B

۱۰

B



**HIV**

: B

Dane

DNA

ξ

HBV

DNA

(HBs Ag)B

HBsAg .

HBs Ag

HBc Ag

HBe Ag

HBc Ag :

HBe Ag

(

)

HBs Ag

**HBV**

HBV

:

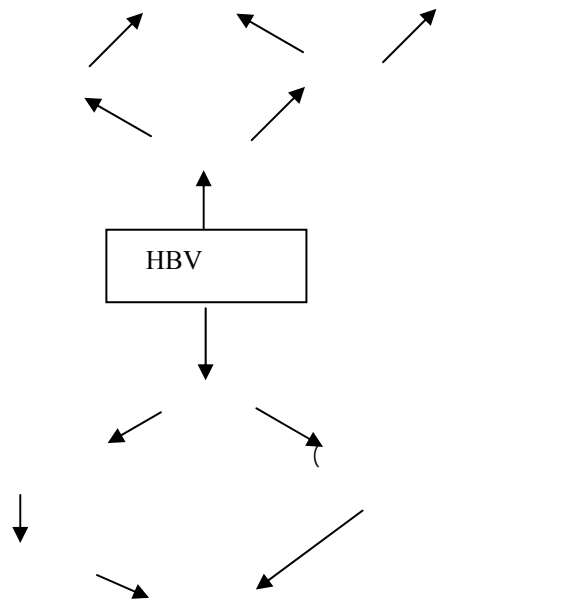
(ritual scarification)



۴

HBV

۴۶



HBV

: ۴۶

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: (Perinatal)



HIV

HBV

HBV ( )

:

HBV

HBV

HBV

ε

HBV

DNA

HBs Ag

HBs Ag

HBe Ag

HBe Ag

IgM anti- HBc

IgG anti-HBc

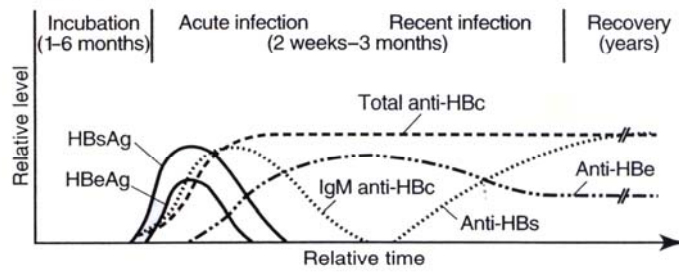
ε IgM



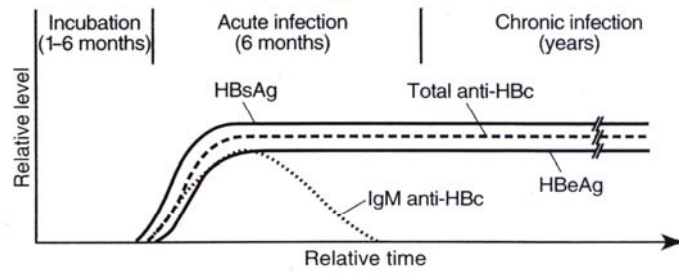
# HIV

HBs Ag      HBs      HBs Ag  
HBe Ag      HBs      HBe  
HBe  
HBs Ag      HBV

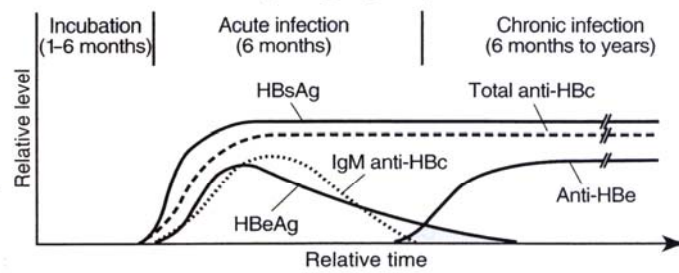
## A Acute HBV infection



## B Chronic HBV infection (HBeAg positive)



## C Chronic HBV infection (HBeAg negative)



B

(B C)

(A)

: 4





HIV

HBs Ag

HBV

HBV

HBV

HBsAg

HBV

HDV

RNA

B

HBs Ag

B

HBV

HDV

---



HIV



HBV

HBV

B

C

RNA

C

C

C

HBV

C

ε

C

B

/o /o

o

HBV

HCV

RNA

o

ε



**HIV**

RNA

RNA

**HCV**  
HCV

:

)

(

RNA

HCV

HBV

HCV

( )  
HCV

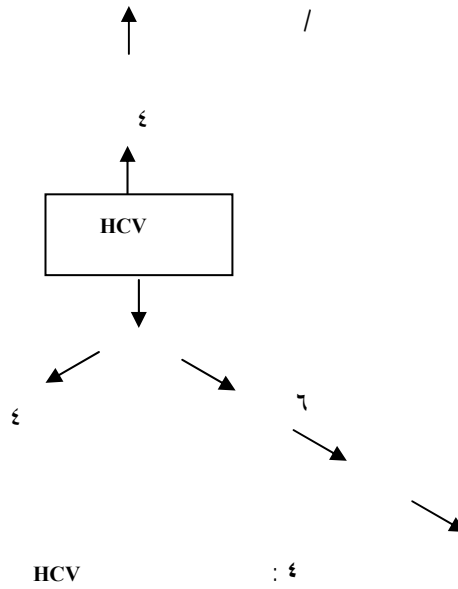
HCV

HCV

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HCV

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HCV

HCV



HIV

HIV

HCV

HCV

HCV

RNA

HCVAg

ε

HBV

IgM

HCV

HCV

HCV RNA

HCV

RNA

RNA

HCV RNA

HCV

EIA



HIV

HCV

RNA

HIV

HIV

HCV

A

(PTHNANB)

B

PTHNANB

HCV

HCV

HCV

HCV

**Tcell**

(HTLV-I)

Tcell

(ATLL ATL)

Tcell

HTLV-I

(tropical spastic paraparesis) TSP

HTLV-II

II HTLV-I .



## HIV

RNA HTLV-II HTLV-I

RNA  
(the enzyme reverse transcriptase)

DNA

HTLV-I  
HTLV-I

( ) ATLL

HTLV-I

ε

CD4<sup>+</sup>  
TSP .

ATLL .

HIV



HTLV-II

HTLV-I, II

HTLV

HTLV

RNA

HTLV

HIV-1,2

HTLV-I,II

HTLV-I, II

HTLV-I, II

HTLV

HTLV

(anti-retroviral)



## HIV

( )

ε

(Syphilis)

(Yaws)

(Pinta)

(Bejel)

(cytoplasmic)

Gram-negative



HIV



ξ ξ ξ

(Treponema pallidum Haemagglutination Assay) TPHA

( ) T T

EIA

EIA



## HIV

IgM

IgG

ε

IgG

RPR

(VDRL)

Reagin

/ /

reagin

IgG IgM

Reagin

HIV

HIV

HIV



(Genito- Urinary Medicine) GUM (STD)

٤

**(Yaws) (Pertenu)**

Yaws

Yaws .

Yaws

Yaws

**(Pinta) (Carateum)**

(Pinta)

**(Bejel) (Endemicum)**

(Bejel)



## HIV

Bejel .

Pinta Yaws

(Protozoa)

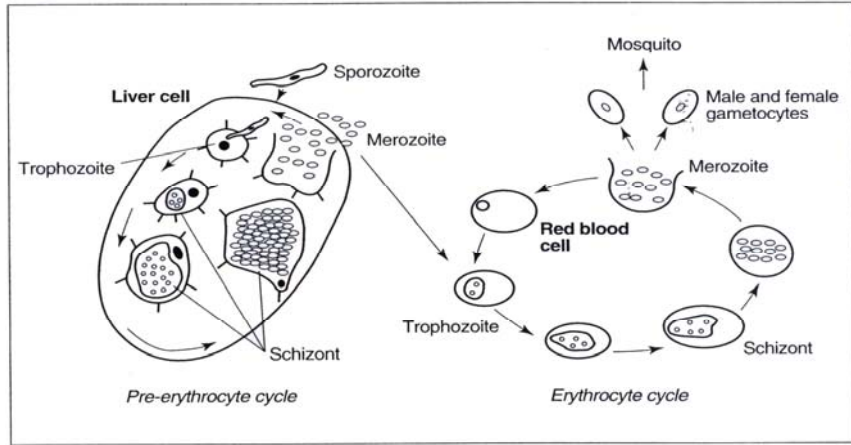
(Sporozoa)

*(Plasmodium vivax)*

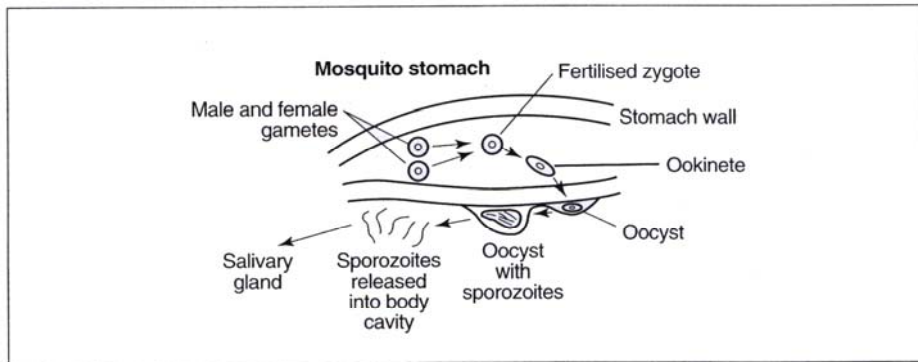
*(Plasmodium Ovale)*

*(Plasmodium Malariae)*

*(Plasmodium Falciparum)*



: 4



: 5

(Sporozoite)

( )

(Trophozoite)



## HIV

(Nuclear body)

(Schizont)

(Merozoite)

(Pre-erythrocyte)

(ring form)

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(ingest)

( )

(Zygote)

(Ookinete)

(Oocyst)

Anopheles

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Anopheles



*P. ovale* *P. vivax*

◦ *P. falciparum*

*P. malariae*

*P. falciparum*

( )

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HIV

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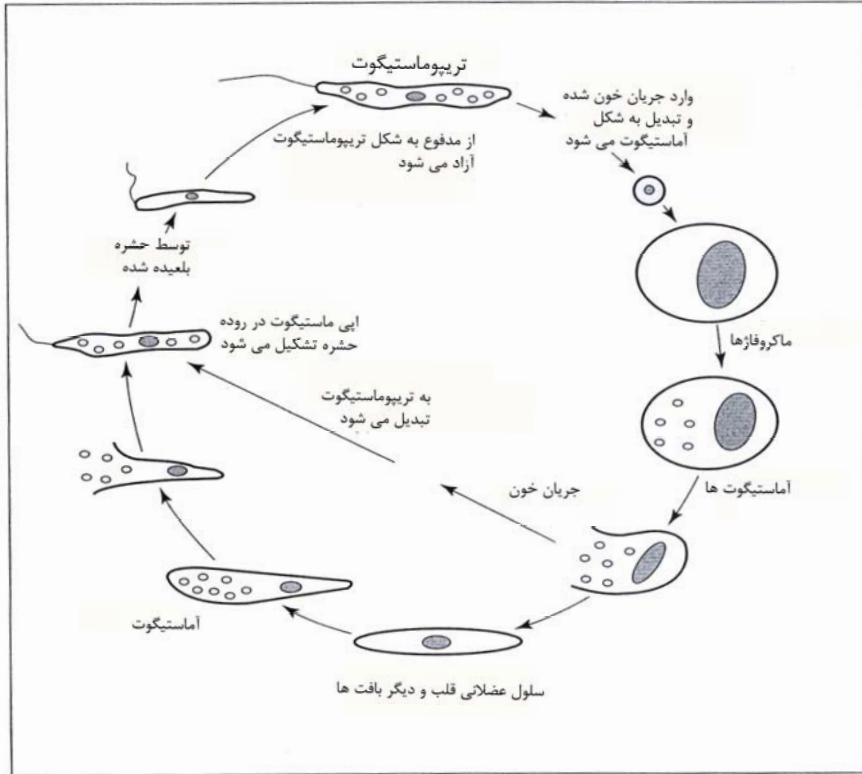


American Trypanosomiasis )  
(T.Cruzi) (  
(Triatomine) (reduviid)  
( )  
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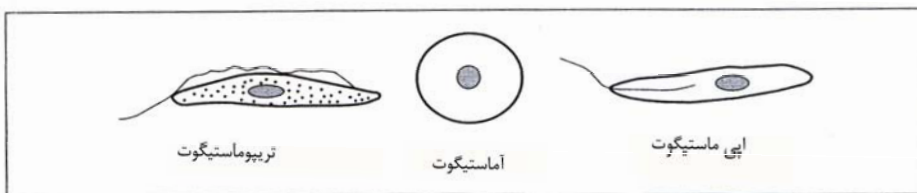
T.cruzi

(

T.cruzi



: ۵



: ۵

HIV



(trypomastigote)

(amastigote)

(epimastigotes)

( )

T.cruzi

Triatomine

Lotriatomine



## HIV

T.cruzi )

(  
(Primary Chagoma )

CHF

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)

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HIV



IHA

EIA

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## HIV

( gentian violet )  
ξ<sup>o</sup>c ξ

:

(T.gambiense)

.( )

(T.rhodesiense)

.( )

T.cruzi

anti-HIV

HIV



anti-HIV



HBV



HTLV ,HCV ,HBV



HIV

anti-HIV





HIV



٥١٤

|     | (£ ) |  |
|-----|------|--|
|     |      |  |
| HIV |      |  |
| ٤   |      |  |
| ٥   |      |  |
| ٦   |      |  |
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HIV





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HIV



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HIV



.HIV

(p66)

=  
=  
p24 =  
p7/p9 = ξ  
= ο  
p17 = ρ  
gp41 =  
gp120 =  
=  
=

HIV

( )

HIV =  
CD4 =  
RNA = ξ  
RNA DNA = ο  
DNA = ρ



## HIV

=

RNA =

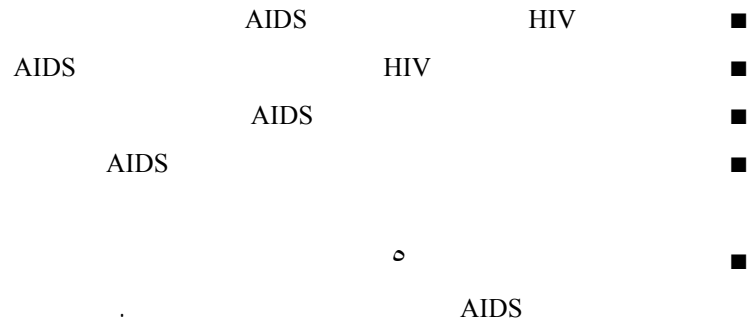
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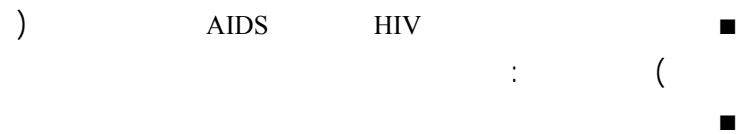
HIV

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AIDS (HIV)



AIDS HIV



HIV



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HIV

HIV

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HIV

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HIV

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HIV



## HIV

HIV

HIV

HIV

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TTI

(assays)

TTI

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/ EIA

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B ( / ٦) cut-off

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/ EIA signal/ cut-off

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signal/ cut-off ٦ C ( / ٦) cut-off

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## HIV

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EIA :

■

(specialized rapid assay)

(particle agglutination assay)

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HIV





TTI

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TTI

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TTI



HIV



TTI

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(training scheme)

TTIs



TTI

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EIA

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EIA

( / ) EIA





## HIV

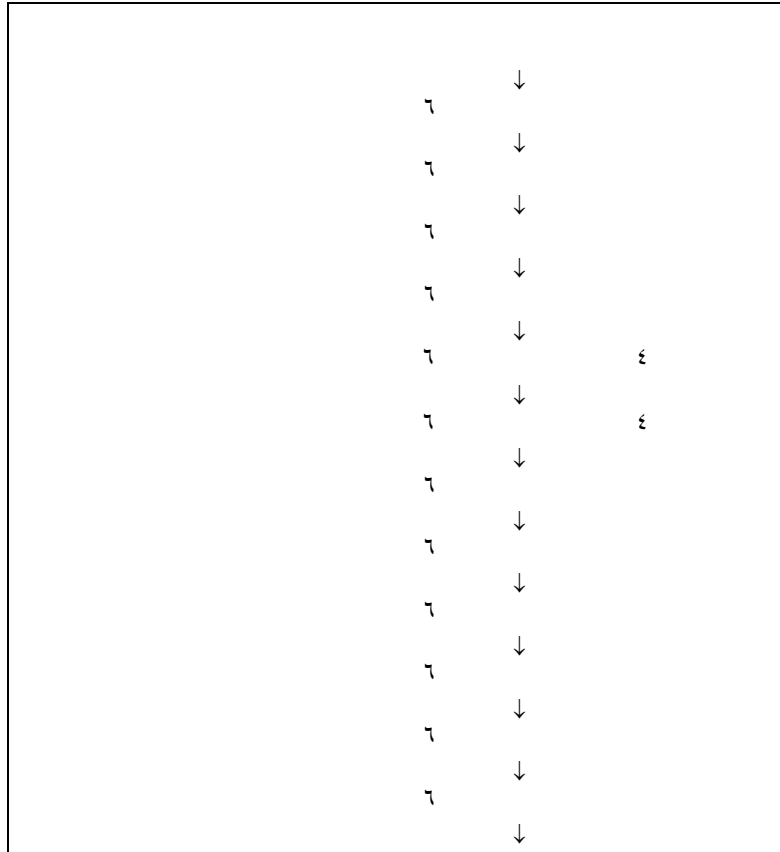
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walk- in cold store





## HIV

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HIV



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## HIV

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- TTIs ■
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(EIAs )

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## HIV

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## TTI

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TTI

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HIV



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TTI

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HIV

TTI

TTI

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HIV



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(SOPs)

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(SOPs)

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## HIV

(SOPs)

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## HIV

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HIV



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IgE, IgD, IgA, IgM, IgG :

-5

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HIV

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(CD4)

HIV -٩

Anti-gp41 Anti-p24 HIV HIV -١٠

HIV ١٤ -١١

: HIV -١٢  
)

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■

HIV -١٣

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: -١٤

(EIA) (ELISA) ■

(particle agglutination assays) ■

(specialized rapid assays) ■



HIV



" " ) "Positive" ■  
" " ( (reactive)



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TTI

TTI

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(QC)

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(QC)



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TTI « »

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TTI

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HIV



TTI

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(SOPs)

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(QA)

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HBV

-٢٧

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HIV

HIV

HIV

HIV

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HIV

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HIV

HIV

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HIV

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HIV

HIV

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HIV



HIV



( )

/ )

(

(HIV )

( >% ◦ >% )

HIV

:

HIV

|   |     |     |     |
|---|-----|-----|-----|
|   | a   | b   | a+b |
| + |     |     |     |
|   | c   | d   | c+d |
| - |     |     |     |
|   | a-c | b+d |     |

=a/ (a+b)

a/(a+c) =

=d/ (c+d)

d/ (b+d) =

HIV

HIV

)

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HIV

( )

HIV

HIV

HIV

HIV

HIV

III II

HIV

HIV

(O HIV-I )

ELISA

ELISA/WB

dot

HIV

HIV



ELISA

HIV

ELISA/WB

HIV

( )

HIV

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|-----|----|-----|
|     |    |     |
| I   |    | /   |
| I   | >% |     |
| II  | ≤% |     |
| I   | >% | /   |
| II  | ≤% | HIV |
| II  | >% |     |
| III | ≤% |     |

/ ELISA  
HIV

I

/

HIV-II HIV-I



HIV

HIV

I

III II

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HIV

HIV

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ELISA

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ELISA

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HIV

HIV

HIV





**HIV**

HIV

**III**

ELISA

II

HIV

III

HIV

HIV

HIV

**HIV**

HIV

III

IV

HIV



HIV

( ٦ )  
HIV

III-II-I

IV III

I

HIV

HIV

II

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III II

HIV

HIV

HIV

HIV

HIV









## HIV

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(core)

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HIV



:

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:( ) DNA

: **Dormant**

: **Envelope (viral)**

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HIV



HIV



: Incidence

: Integration

: Latency

( )

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**HIV**

HIV



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( ) RNA ( ) DNA :

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RNA DNA

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DNA

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HIV

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HIV



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RNA  
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DNA RNA

:( ) RNA

RNA

:(Sensitivity)

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HIV

: SOP

: (Specificity)

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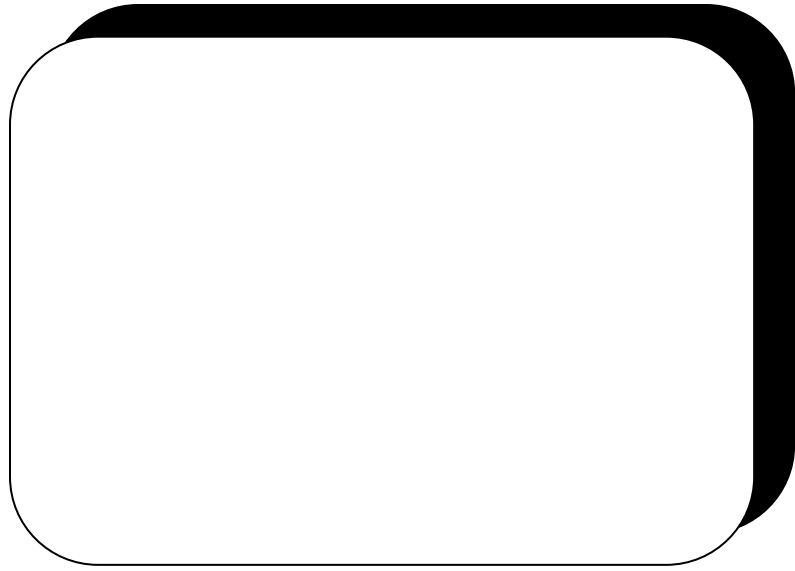
:

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HIV



:





( )

.(WHO/GPA)

HIV

(Rhesus)Rh ABO



سازمان بهداشت و درمان  
جمهوری اسلامی ایران





|                |            |     |     |
|----------------|------------|-----|-----|
|                |            |     | ( ) |
|                | ABO        | ABO | :   |
| B A            |            |     | .   |
|                |            | A   | :   |
|                | (Rhesus)Rh | Rh  | :   |
| D <sup>u</sup> | RhD        | Rh  | .   |



:

:

:

ABO

D

RhD

RhD

Rh

(D<sup>u</sup>)



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:

|  | ( ) |  |
|--|-----|--|
|  |     | <p>ABO</p> <p>ABO</p> <p>RhD      RhD      Rh      D<sup>u</sup></p> |



( )



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|  |  |  |  | ABO |
|  |  |  |  | Rh  |
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|  |
|--|
|  |
|--|





سازمان آموزش عالی



( ) ( )  
( )

(Coagulation factors)

(transport medium)

(Erythrocytes)

/ ( )  
( \* L)

(haem)  
(globin)

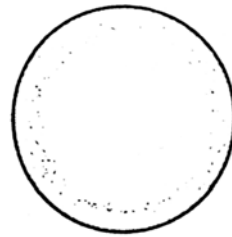


**(Haemoglobin**

(haem)

(globin)

g/dl                      /                      / g/dl                      (g/dl)



:  
)

WHO

.(

/ g/dl



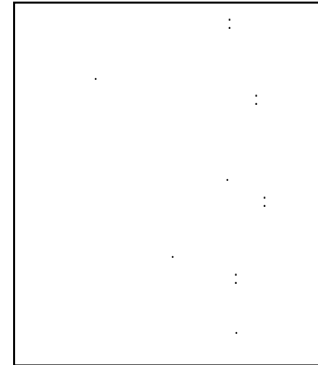


(Phagocytosis)

(Thrombocytes)

( )

( \* /L)



(Serum)

(extrinsic)

(intrinsic)

( )



( ) ( )

( )

)

( )

( ) :

.( )



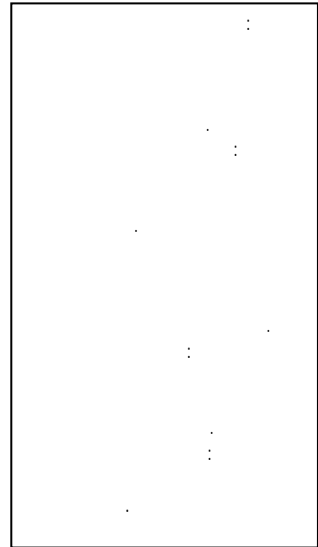
سازمان آموزش عالی



( )

(Antigens)

(Antibodies)







(gamma-globulin)

(Ig)

IgE IgD IgA IgM IgG

IgM IgG

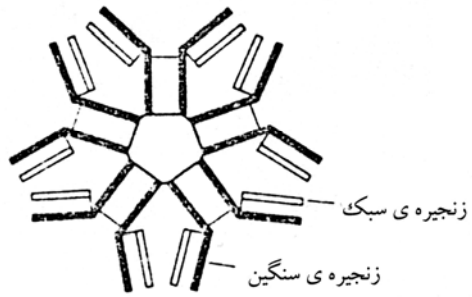
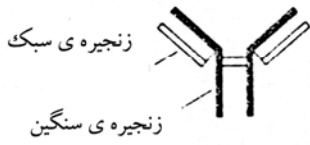
IgG .

IgM

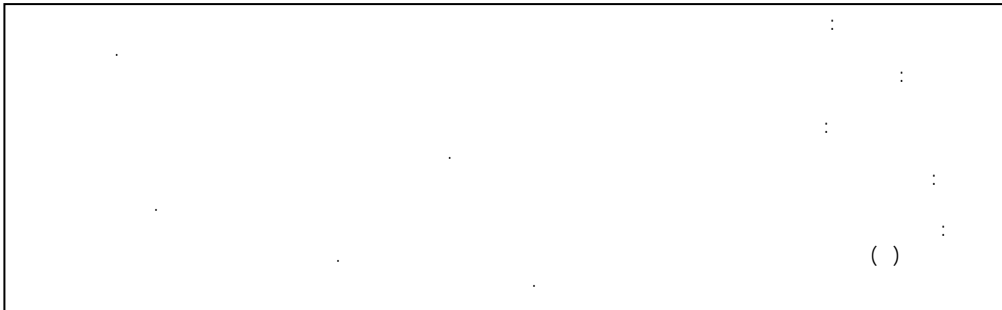
IgM

IgG

IgM



IgM IgG



IgG

IgG

%



(HDN)

( ) IgG

**IgM**

%

**IgM**

IgG

IgM

**IgM IgG** :

| <b>IgM</b> | <b>IgG</b> |
|------------|------------|
| °C         | °C         |
| (immune)   |            |

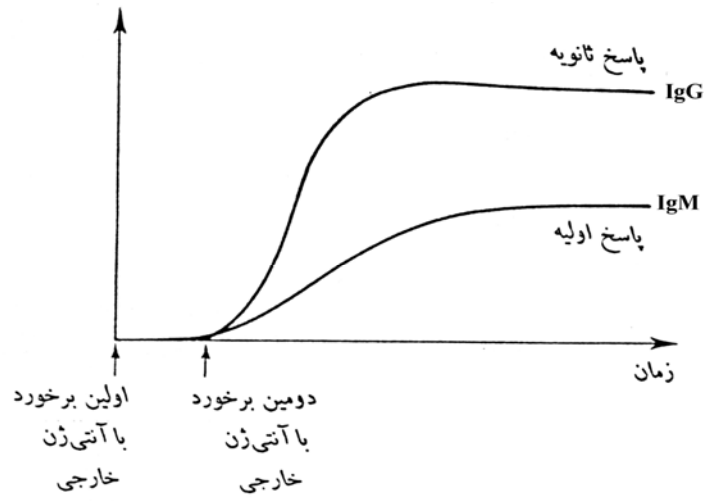
|   |   |
|---|---|
| ) | : |
| ( | : |



IgG

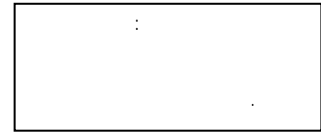
IgM

( )



(immune)

ABO



ABO

B A

(naturally-occurring antibodies)

AB

( IgM )

IgG

( )

(lattice)

IgM

IgM



IgM



IgG

( )



IgG

( )

( )

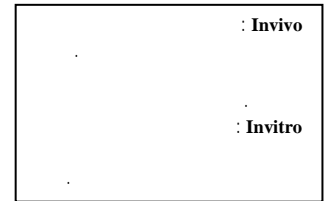
IgG

IgM

( )

(invitro)

(invivo)



( )

IgG



IgM  
IgG IgM

(zeta-potential)

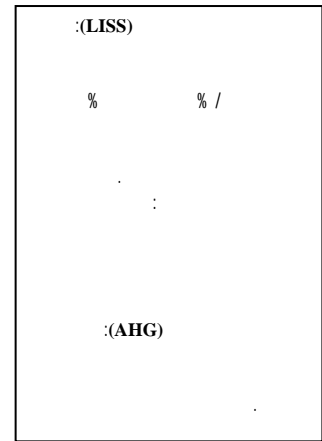
pH / / pH Rh pH **pH**

°C

%



(LISS Low Ionic Strength Sotution)



IgG

(Layering)

(antiglobulin test)

:

:

:

:

(AHC)  
 ( C<sub>3</sub> ) IgG  
 IgG

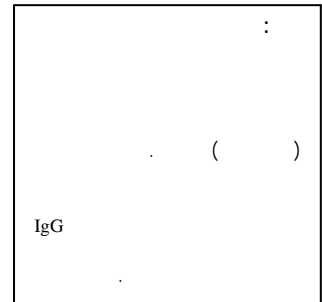


Y = مولکول های IgG  
 Y = مولکول های آنتی گلوبولین

IgG :

IgG  
 ( )  
 ( )

(Proteolytic enzymes)







IgG

IgM

B A

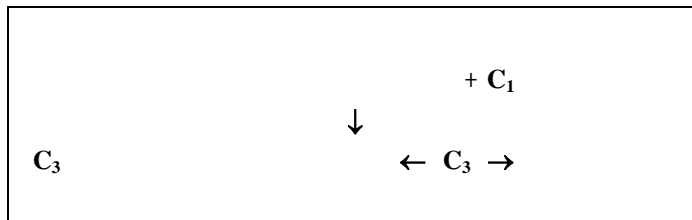
)

(

C<sub>3</sub>

C<sub>3</sub>

( )



:



.....

( )

( )

.IgE IgD IgA IgM IgG

IgM

IgG

IgM

IgG

:

( )

C<sub>3</sub>

ABO



جمهوری اسلامی ایران



## ABO

ABO

:

ABO

ABO

O AB B A

.  
A

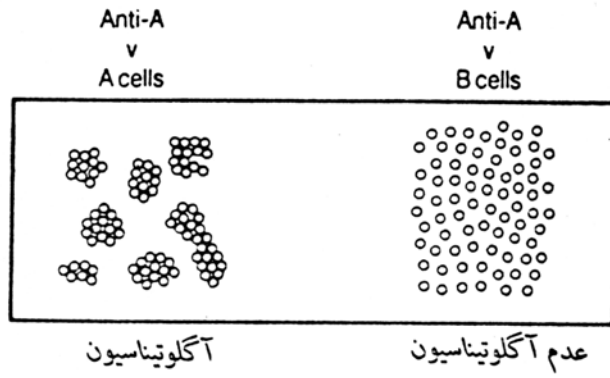
ABO

( )  
)

.(



سازمان بهداشتی درمانی جمهوری اسلامی ایران



B A A :

B A

ABO

B A A

AB B A B

O

A

A

B A B B

( ) B A

B (A )

A (B )

B A (AB ) B A

A (O ) B A

B



:

|         |     |    |
|---------|-----|----|
| Anti-B  | A   | A  |
| Anti-A  | B   | B  |
|         | B A | AB |
| Anti-AB |     | O  |



O AB B A B A  
(+)

( )

|    |   |   |
|----|---|---|
|    | A | B |
| A  |   |   |
| B  |   |   |
| AB |   |   |
| O  |   |   |

O B A

O AB B A

|    |   |   |   |
|----|---|---|---|
|    | A | B | O |
| A  |   |   |   |
| B  |   |   |   |
| AB |   |   |   |
| O  |   |   |   |



سازمان بهداشتی، درمانی و رفاهی



( ) ova spermatozoa

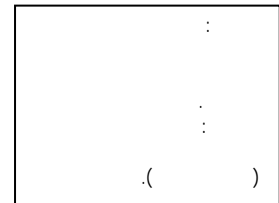
abo

)

ABO

O B A

O B A



AA AO

A

O

B A

BB BO

B

:

( )

|    |    |
|----|----|
| AA | A  |
| AO | A  |
| BB | B  |
| BO | B  |
| AB | AB |

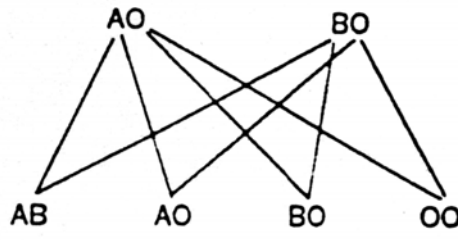


$$\frac{OO \quad O}{ABO}$$

OO (B ) BO (A ) AO (AB ) AB      ABO      (O )



ژنوتیپ:



ژنوتیپ:

فنوتیپ:

AB      A      B      O

ABO :

AB : OO

BO : BO

BO : OO

**ABO**

B

B

A

A

AB

B

A

ABO





( ) .

(reverse grouping test)

B A

A B B A

( ) .

B A

B

B



| A | B | A | B |
|---|---|---|---|
|   |   |   |   |

ABO



**ABO**

:

|    |
|----|
|    |
| A  |
| B  |
| AB |
| O  |

AB A ( )

O

O

O

B A

(irregular antibodies)

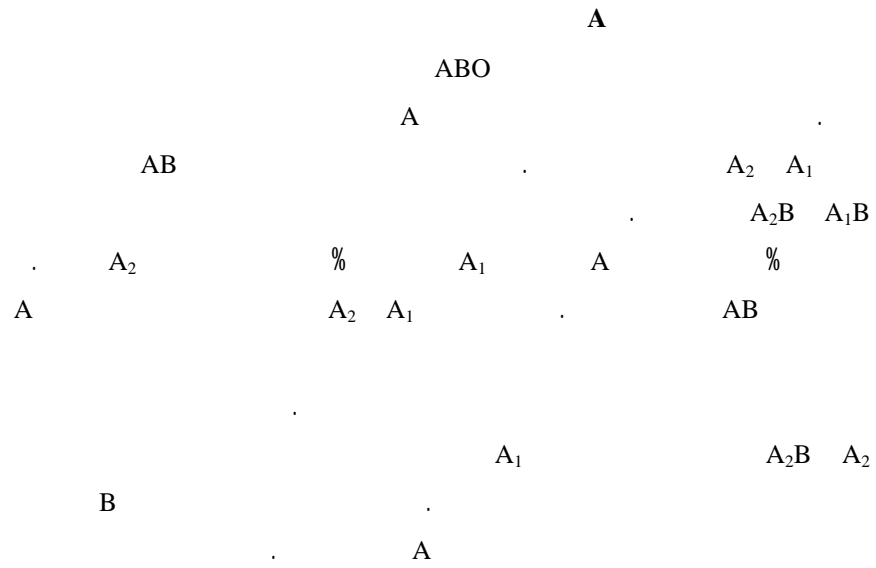
O

**B A**

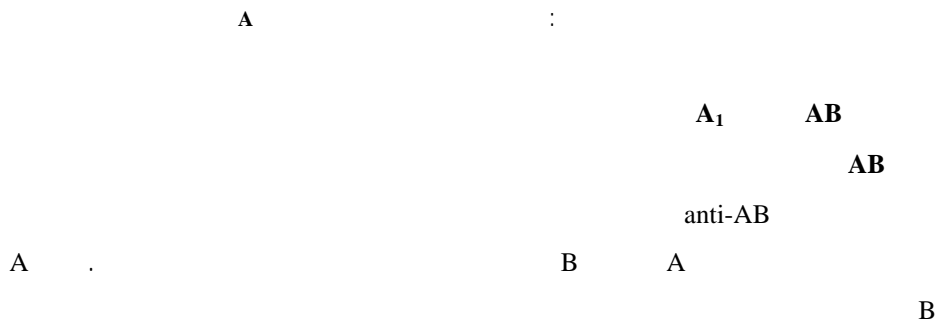
B A

B A

B A



| <b>A</b>         |   |        |                       |
|------------------|---|--------|-----------------------|
| A <sub>1</sub>   | % | Anti-B |                       |
| A <sub>2</sub>   | % | Anti-B | % Anti-A <sub>1</sub> |
| A <sub>1</sub> B | % |        |                       |
| A <sub>2</sub> B | % |        | % Anti-A <sub>1</sub> |





AB

B A

A

A

A<sub>2</sub>B A<sub>1</sub>B A<sub>2</sub> A<sub>1</sub>

A

A<sub>1</sub>B A<sub>1</sub>

A<sub>1</sub>

A<sub>1</sub>

A<sub>1</sub>

A

anti-A<sub>1</sub>

|                | A <sub>1</sub> | A <sub>2</sub> | A <sub>1</sub> B | A <sub>2</sub> B |
|----------------|----------------|----------------|------------------|------------------|
| A              |                |                |                  |                  |
| AB             |                |                |                  |                  |
| A <sub>1</sub> |                |                |                  |                  |

ABO

:



ABO

| Anti-A | Anti-B | Anti-AB | A cells | B cells | O cells |
|--------|--------|---------|---------|---------|---------|
|        |        |         |         |         |         |



(secretor status)

B A



%

IgG IgM ( ) B A

IgM B / A AB

IgG O

B A

IgG AB

O " " AB

IgM AB

B / A

O

O

B A

AB

O

( )

O

O

A

)

B /

AB

(

DTT(Dithiothreitol) (Substances soluble AB)

B A

O

B / A

IgG AB

)

D

(HDN)



IgG AB .(



ABO

B A  
IgG

(DAT)

|         |
|---------|
| : (DAT) |
| : (IAT) |
| ( )     |

%

(ABO HDN)ABO

(DAT)

(HDN)

(DAT)

(AHG)

(IAT)

ABO



ABO

ABO

ABO

ABO

A<sub>2</sub>B A<sub>1</sub>B AB A<sub>2</sub> A<sub>1</sub> : A

IgG IgM B A

: O B A IgG AB

O B A O

ABO

AB

ABO

O AB B A

ABO A







## Rh

D (Rh)

Rh

Rh

RhD

RhD

RhD

D<sup>u</sup>

(D<sup>u</sup>)

Rh

**Rh**

( )

ABO

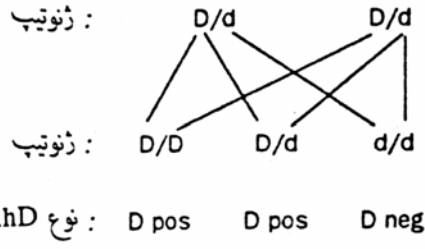
ABO

(ABO )





) (Heterozygous) (D/D) D  
 d (D/d) d D  
 D D  
 (D/d) D  
 D (d/d) D d



D D :



RhD

|       |     |     |  |     |     |
|-------|-----|-----|--|-----|-----|
|       | D/D | D/d |  | D/d | d/d |
| RhD : |     |     |  |     |     |
|       |     |     |  |     |     |
|       |     |     |  |     |     |

\*  
 % RhD  
 D % D

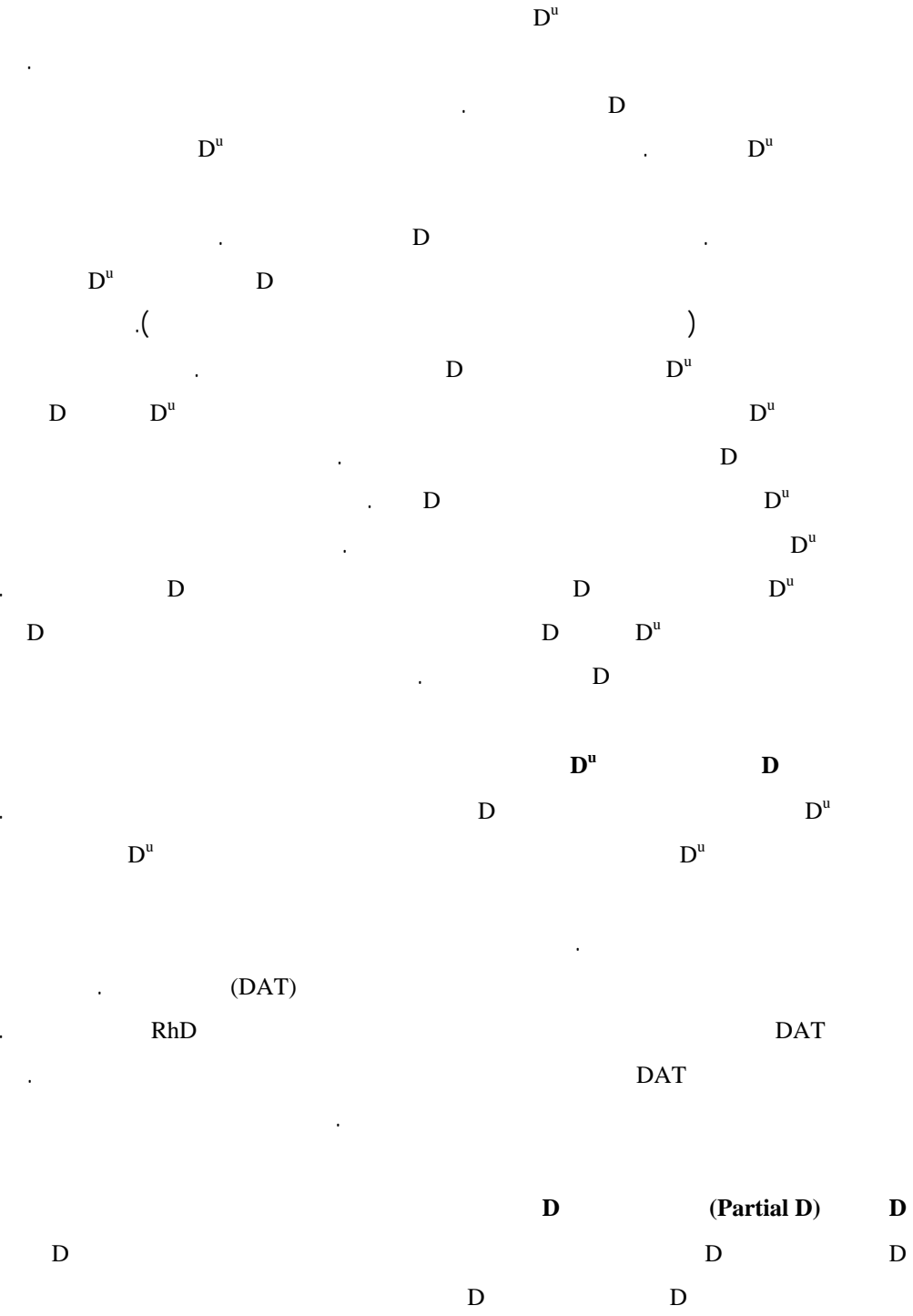


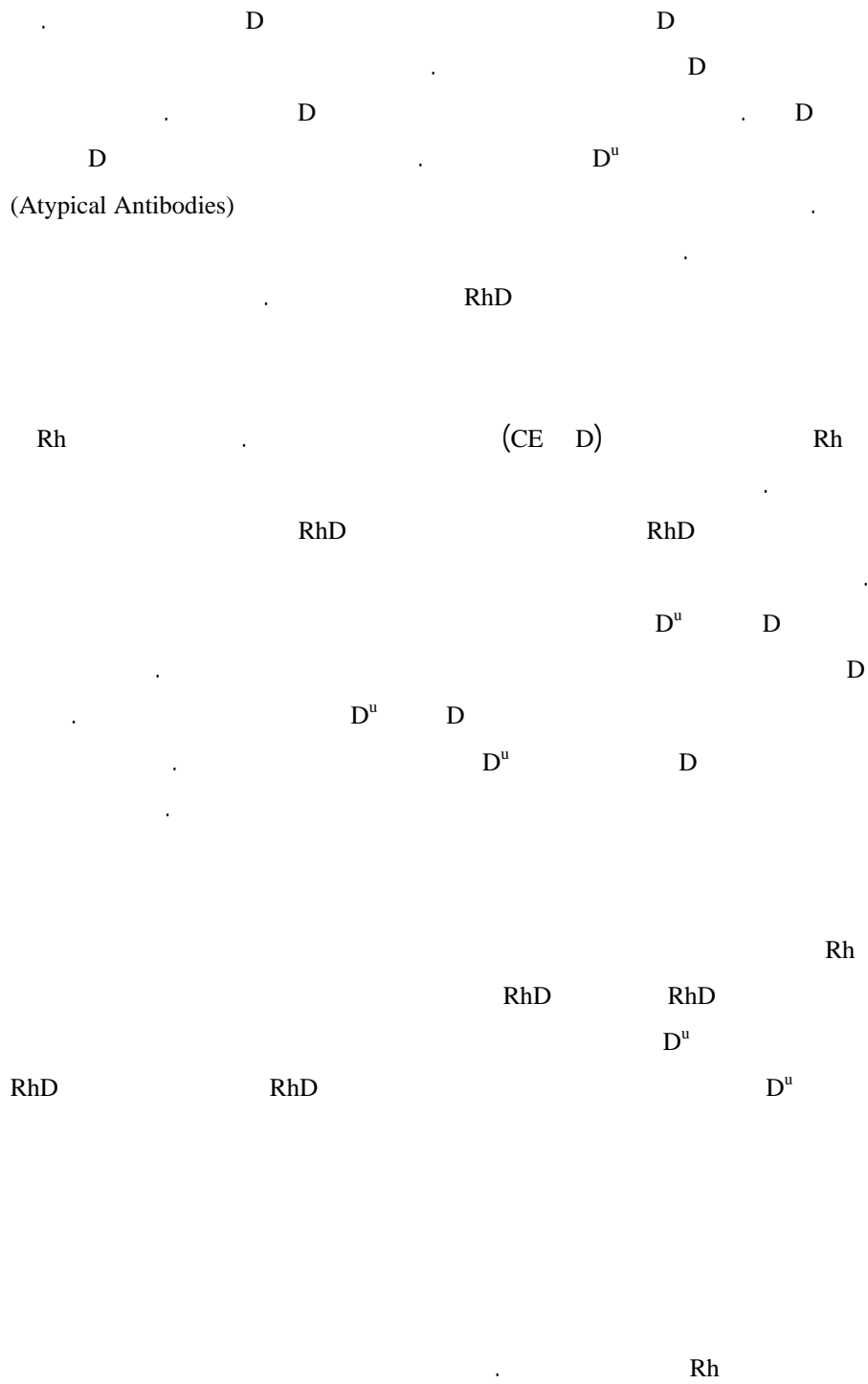
D D





الوزارة  
الصحة  
الدولة  
قطر







Rh  
RhD RhD  
RhD  
D<sup>u</sup> (D<sup>u</sup>) D

( )

( ) ( )





Rh ABO

(cross-match)

(major cross-match)

**ABO Rh**

Rh ABO

Kidd kell Buffy

)

(

:



ABO

ABO

|  | Rh | ABO |    |
|--|----|-----|----|
|  | O  |     | O  |
|  | O  | A   | O  |
|  | O  | B   | B  |
|  | O  | A B | AB |

ABO

:

:

RhD

Anti-D

Anti-D

RhD

.(HDN)

HDN

| ABO |         | AB |   |
|-----|---------|----|---|
|     |         | B  | A |
| O   | ( B )   | AB | A |
| O   | ( A )   | B  | A |
|     | ( B A ) | O  | O |

ABO :

ABO

) massive transfusion

( )

(



)

(

(atypic antibodies)

**(Massive-Transfusion)**

(massive transfusion)

Rh ABO

Rh ABO





(red cells)

(whole blood)

( )

ABO RhD

:

:RhD

RhD O

ABO

RhD

:ABO

RhD

O

:

RhD

O

Rh ABO

anti-Kell anti-C

Rh

Rh

ABO

:

| ABO | RhD        |
|-----|------------|
|     | ORh        |
|     | ORh        |
| ORh | ARh / ORh  |
| ORh | ARh        |
| ORh | BRh / ORh  |
| ORh | BRh        |
| ORh | ABRh / ORh |
| ORh | ABRh       |



ABO RhD HDN

RhD O

ABO

RhD

RhD

HDN

RhD O

ABO

Rh O

(Paediatric blood bag)

O







$OR_2R_2$  (cDE/cDE)  
Orr(cde/cde)

$OR_1R_1$  (CDe/CDe)

(LISS)

**(Matching)**

( )

( )

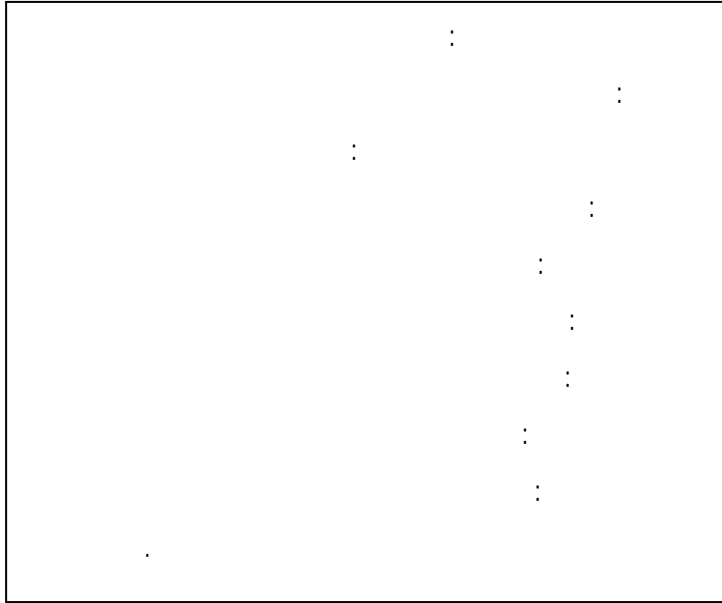
Rh ABO

ABO





سازمان آموزش عالی





RhD ABO

( )

( )

(% )

(immediate spin)

(Blood Ordering Schedule)



RhD ABO

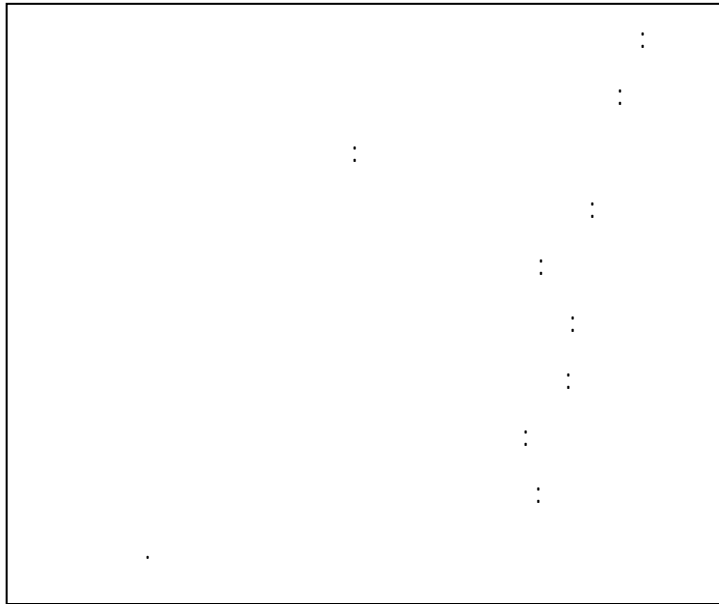
Rh ABO

"

"

(bleed line)

(check)



Rh O

( )



:

)

(

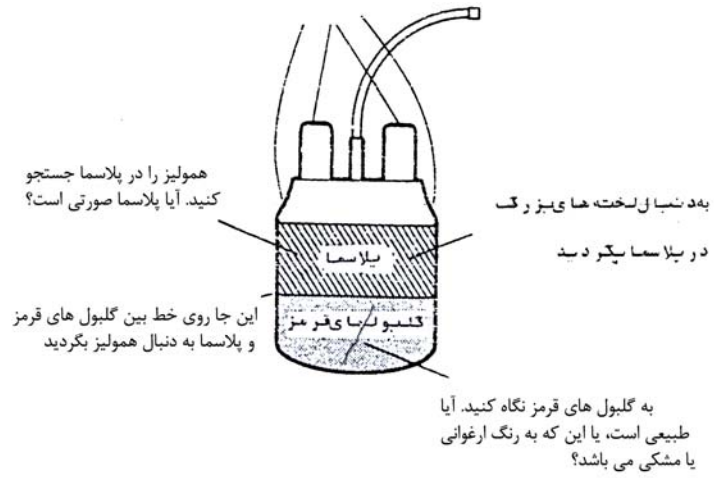


B anti-HIV

آیا نشستی وجود دارد؟ آیا شما کیسه را

فشار داده اید؟ اینجا را از نظر وجود

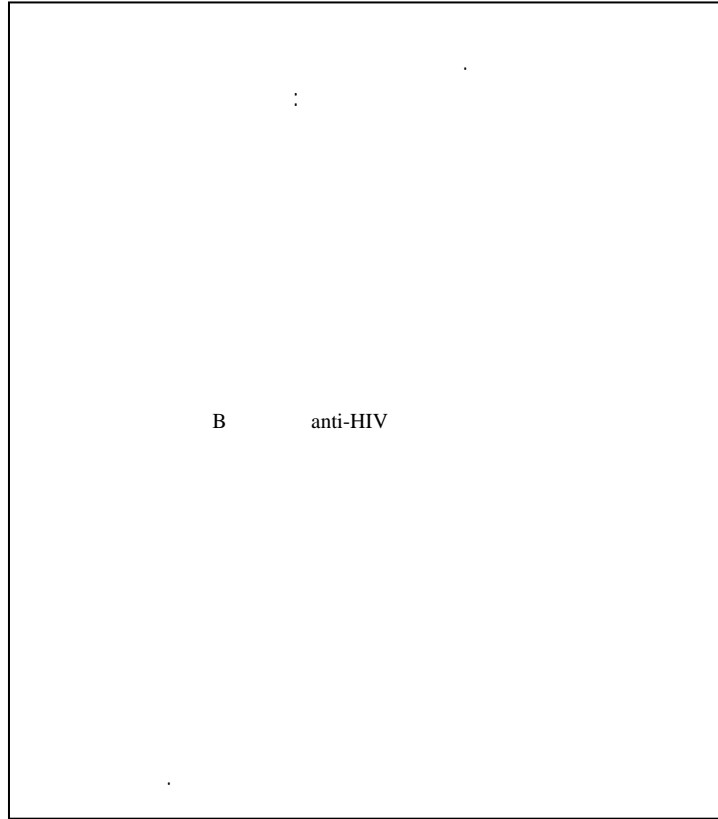
خون بیرونی کنید







:



B anti-HIV

:



+ +

( )

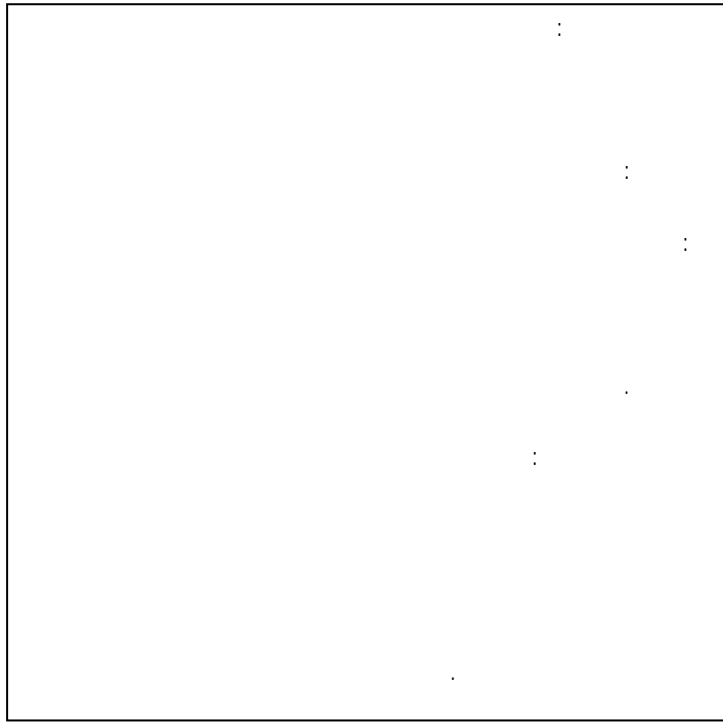
( )

)

(

( )

(Check list)



)

(

)

(

:





(Urticaria)

:

(Haemoglobinaemia)

anti-B

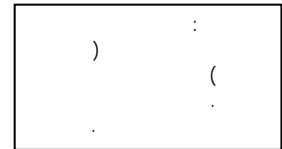
anti-A

IgM

ABO

IgG

(macrophage)



)

(

/

RhD ABO

)

(

(methaemalbumin)



)

(

(SOP)

.Rh ABO

%

%

RhD

RhD

Neg

Pos

( Rh

Rh) "Rh Neg"

"Rh Pos"

anti-D

RhD



( )

ABO

RhD

( )

:

RhD ABO





( )

:

| A B O |        |        |         |          |          |          |        |        |  | Rh |  |
|-------|--------|--------|---------|----------|----------|----------|--------|--------|--|----|--|
|       | Anti-A | Anti-B | Anti-AB | Ac cells | Bc cells | Oc cells | Anti-O | Anti-D |  |    |  |
|       |        |        |         |          |          |          |        |        |  |    |  |
|       |        |        |         |          |          |          |        |        |  |    |  |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|  |  |  |  |  |  |

:



( )

RhD ABO

:

/

RhD ABO

( )

:

RhD ABO

:





)

(







RhD ABO

)  
(.

)  
(

:

- A RhD
- A RhD
- O RhD
- O RhD
- B RhD
- B RhD
- AB RhD
- AB RhD



:

A RhD  
A RhD  
O RhD  
O RhD  
B RhD  
B RhD  
AB RhD  
AB RhD



( )



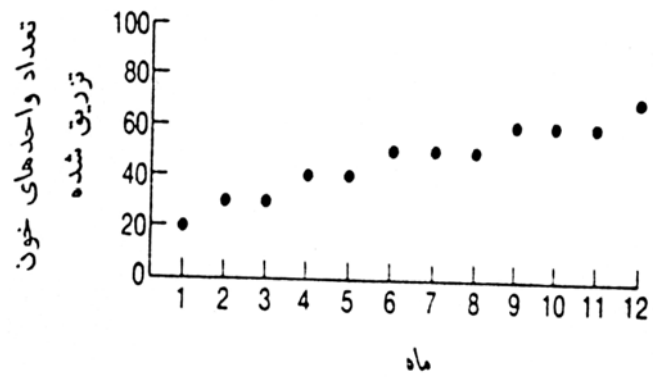


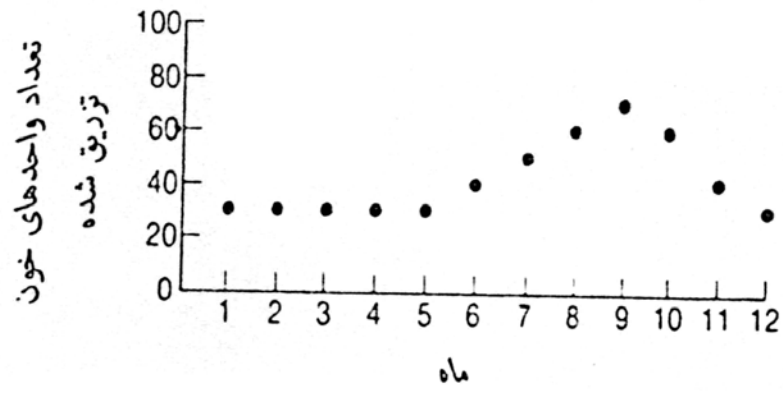
)

(

RhD ABO

(cancel)





( )



(Outdate rate)

:

%

Rh A

%

Rh A

(Cancel)

(cancel)



:

RhD ABO

(Massive Transfusion)



Rh O

( )

:

:

( )



RhD ABO

( )



---

(scoring system)

Rh ABO

(+ + + + )

---

: scoring system





( )

:

( )

(IS)

Rh

RhD ABO

RhD ABO

D<sup>u</sup> D

(IAT)

(LISS/IAT)

LISS

LISS

(DAT)

IgG

IAT

:

LISS

(handling)

ABO

( )

( \* mm) ( \* mm) ( )

( \* \*)  
pH

( ) ( )

:





/ / pH

pH

pH

pH

pH

/

:

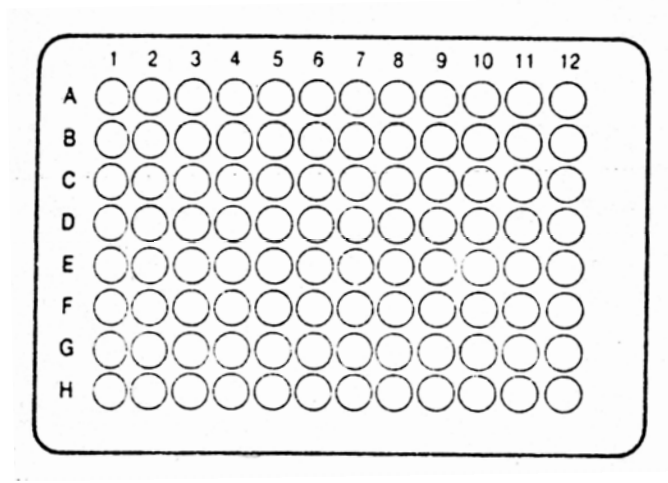
( )

( )

( )

\*

\*



V

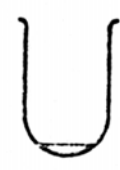
U



U



U



U

A

A

)

(

(\* \* )

)

(

---



:

= +

= +

= +

= +

=

=L

(Hybridomas)

RhD ABO

(

)

(

HIV

pH

IgM

IgG

( )



(% )

( )

%

( )

( )

%

**O B A**

RhD O      RhD B      RhD A

RhD ABO



%





( )

:

( )

( )

:



RhD ABO  
RhD ABO  
ABO  
)  
RhD  
RhD ABO  
RhD ABO  
RhD ABO

A )  
(O B A ) (AB B  
) (D<sup>u</sup>) D D  
(

AB B A  
D O B A  
D<sup>u</sup>  
B A

RhD ABO  
RhD ABO



**RhD ABO**

RhD ABO

**(D<sup>u</sup>) D**

D<sup>u</sup>

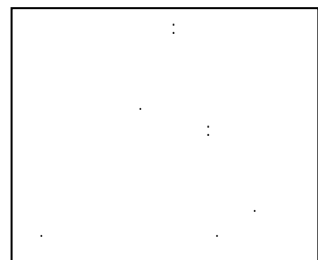


RhD ABO

( )

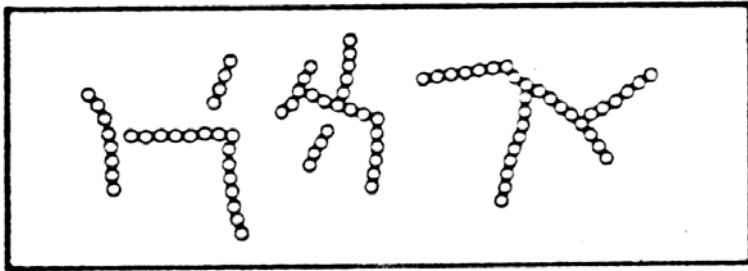
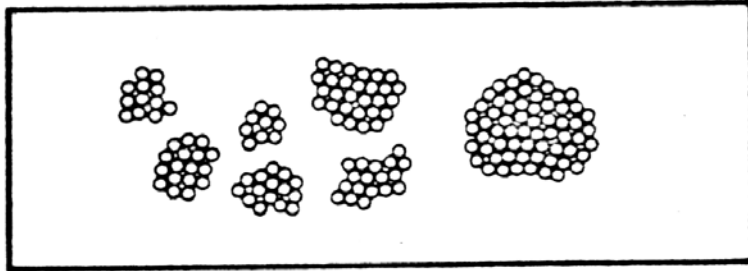
RhD ABO

(Pseudo-agglutination)



/

(% / )



)

(



O B A

ABO

( )

(immune)

ABO

(IgG ABO )

RhD ABO





سازمان بهداشت و درمان  
جمهوری اسلامی ایران

(LISS)

(LISS)

" LISS"

LISS

LISS %

(LISS addition)

%

LISS

pH .

/ /

(AHG)

AHG

AHG

IgG

(AHG)

AHG

IgG

---

|                                       |
|---------------------------------------|
|                                       |
| (Cross-contamination)                 |
|                                       |
| (AHG)<br><br>pH<br><br>AHG<br><br>AHG |

( ) in vivo  
(DAT)

AHG

**microcolumns**





( )

AHG

( )

( )

Anti-A Anti-B

(Auto Immune Anaemia)

IgG

**(Layering)**

(IAT)

(Layering)

(IAT)

(AHG)

RhD

anti-D



:



(IgM IgG )

**(IAT)**  
IAT

(immune)

( )

ABO



( )

( )

(Cross-match)

ABO

IgG

:

(ABO )

RhD ABO

( )

(cross-match)

(immune)

(IAT)



( )  
( )

:

(IAT)

LISS



B A O  
٦٠٠

٦٠٠

O O

٦٠٠

٦٠٠



( ) L ( ) + + ( )

: (IAT)

AHG

(DAT)

(cross-match)

ABO

IgG



حکومت پنجاب  
وزارت صحت و تندرستی









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|  |     | -                   |
|--|-----|---------------------|
|  | ABO | ABO                 |
|  |     | Rh                  |
|  |     | RhD RhD             |
|  |     | (D <sup>+</sup> ) D |



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سازمان بهداشتی درمانی ایران



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O AB B A  
O B A

B A  
O AB B A

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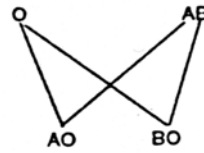




| Group | Anti-A | Anti-B |
|-------|--------|--------|
| A     | +      |        |
| B     |        | +      |
| AB    | +      | +      |
| O     |        |        |

| Group | A cells | B cells | O cells |
|-------|---------|---------|---------|
| A     |         | +       |         |
| B     | +       |         |         |
| AB    |         |         |         |
| O     | +       | +       |         |

ۋنوتىپ

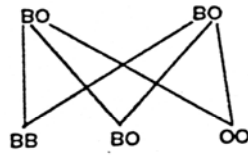


ۋنوتىپ

A B

فنتىپ

ۋنوتىپ

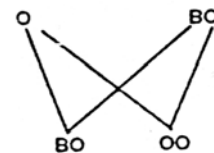


ۋنوتىپ

B B O

فنتىپ

ۋنوتىپ



ۋنوتىپ

B O

فنتىپ

A  
O  
AB  
O  
B  
O  
AB  
A  
B  
A



ABO

O AB A

:



ABO

Anti-A<sub>1</sub>

A



O



B



Anti-A<sub>1</sub>

AB



A<sub>2</sub>B

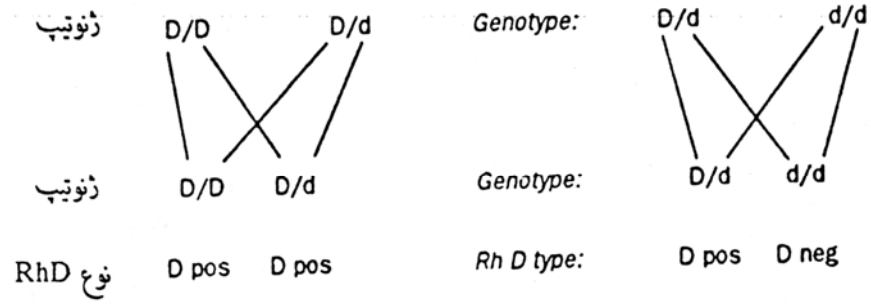
AB



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RhD



RhD RhD

Rh

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RhD RhD

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سازمان آموزش عالی

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/ A Rh positive  
/ A Rh negative  
/ O Rh positive  
/ O Rh negative  
/ B Rh positive  
/ B Rh negative  
/ AB Rh positive  
/ AB Rh negative

A Rh positive  
A Rh negative  
O Rh positive  
O Rh negative  
B Rh positive  
B Rh negative  
AB Rh positive  
AB Rh negative



دولة فلسطين

Rh ABO

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RhD ABO

RhD ABO

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IgM

(IgG )

ABO

( IgM )

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Rh ABO  
anti-Duffy anti-kell

Rh ABO

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(Cross-contamination)

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AHG



pH

AHG

:

(Autoimmune haemolytic anemia)

(IgM IgG )

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- 
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( )

**(Agglutination)**

**(Allelic gene)**

**(Antibody)**

**(Antigen)**

**(Antiglobulin reagent=AHG)**

**(Antiglobulin test)**

**(Basophil)**



(Blood ordering schedule)

(Chromosome)

(Coagulation)

(Coated cells)

(Complement)

(Cross-match)

(Direct anti-human globulin test-DAT)

(Enzyme)

(Zeta Potential)

IgG

—



(Eosinophil)

(Erythrocyte)

( )

(Fibrin)

(Fibrinogen)

(Gammaglobulin)

(Gene)

(Granulocyte)

(leucocyte)

(Haemoglobin)

(globin)

(haem)

(Haemoglobinaemia)

( )





**(Haemolysin)**

( )

**(Haemolysis)**

( )

**(Haemolytic disease of the newborn)**

**(Haplotype)**

**(Heterozygous)**

**(Homozygous)**

**(Immunoglobulin)**

**(Indirect anti-human globulin test=IAT)**



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(in vitro)

(in vivo)

(Laryngeal oedema)

(Leucocyte)

LISS

(Low Ionic Strength Solution=LISS)

%

(Lymphocyte)

B :

T

(Macrophage)

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سازمان آموزش عالی





**(Monocyte)**

(A large Leucocyte)

**(Naturally-occurring or naturally-acquired antibody)**

**(Neutrophil)**

**(Phagocytosis)**

**(Phenotype)**

( )

**(Plasma)**

**(Primary antibody response)**

( )

**(Pseudo-agglutination)**

**(Reticuloendothelial system)**



**(Reverse grouping test)**

ABO

**(Rouleaux Formation)**

**(Secondary antibody response)**

**(Secretor)**

**(Sensitized cell)**

**(Serum)**

**(Urticaria)**

(weals)

**(Voluntary non-remunerated blood donor)**



pH . / /

pH . / gr

pH . / /

pH .

pH

:

**:A**

/ mol/L Sodium dihydrogen phosphate

/ g Sodium dihydrogen phosphate dihydrate  
(Anhydrous 18.09)  
ml

**:B**

/ mol/L Disodium hydrogen phosphate

/ k Disodium hydrogen phosphate dodecahydrate  
(dihydrate 26.79)  
(anhydrous 21.39)  
ml

ml . pH B ml A ml



pH

/ /

pH

(SOP)

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:

/ / ml

%

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%

(IS)

RhD

ABO

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%

(IS)

/

\* mm



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**RhD**

\* mm



anti-D







**ABO**

**RhD**

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D B A

( )

**RhD ABO**

ABO

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%



( ) AB B A  
O B A



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O B A

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**RhD**

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(AHG) ■

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AHG

(DAT)

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D<sup>u</sup>

DAT

(D<sup>u</sup>) Rh

DAT

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IgG

(IAT)

( ) \* mm ■



(AHG)

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AHG

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IgG

IgG

(LISS/IAT)

LISS



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(LISS) (IgG)

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(DAT)

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**IgG**

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Rh O ■



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IgG

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IgG

(IAT)



## LISS

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LISS

AHG

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IgG

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LISS

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( \* mm)

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(IAT )

LISS

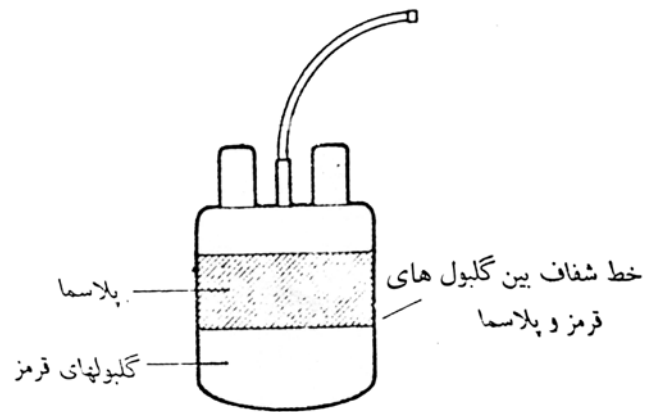
( )

(aseptic)

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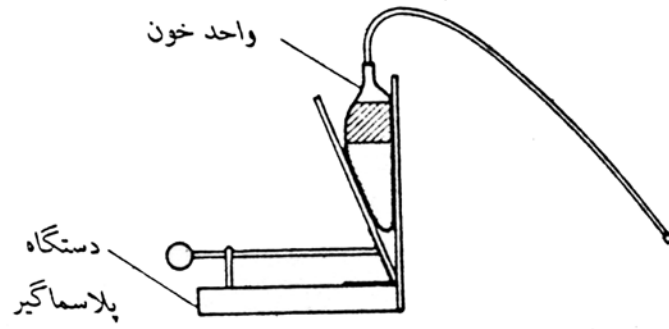
(hand-held tube sealer)

( )

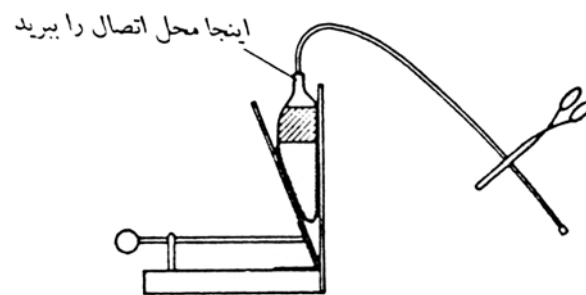




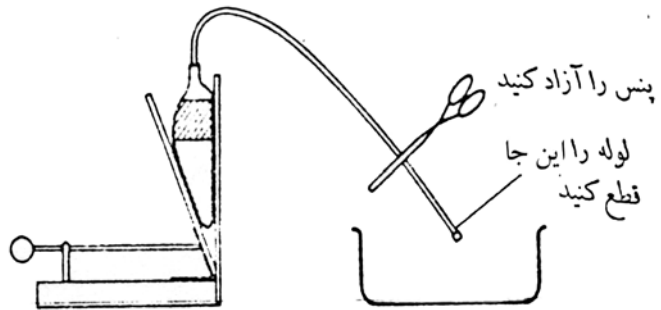
( )



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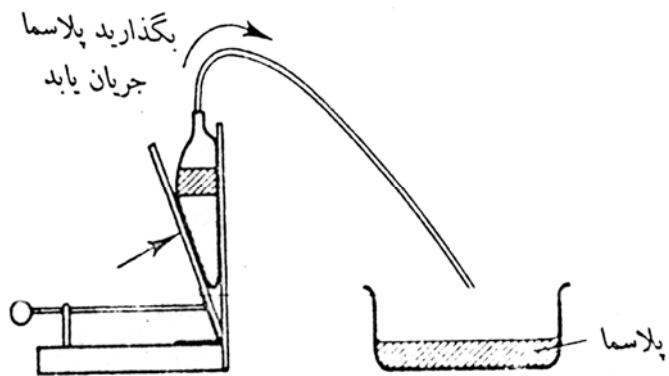
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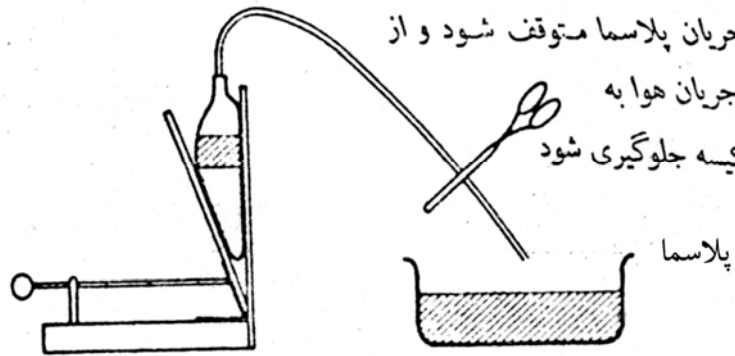


پنس را مجدداً نصب کنید. تا

جریان پلاسما متوقف شود و از

جریان هوا به

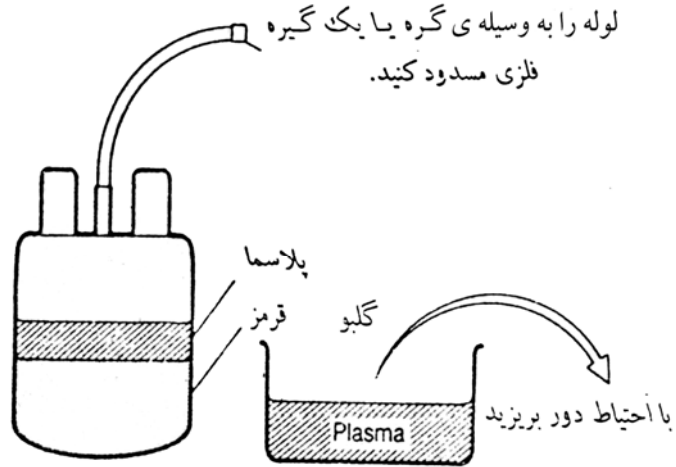
کیسه جلوگیری شود



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لوله را به وسیله ی گره یا یک گیره

فلزی مسدود کنید.



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