Serodiagnosis of Infectious Diseases

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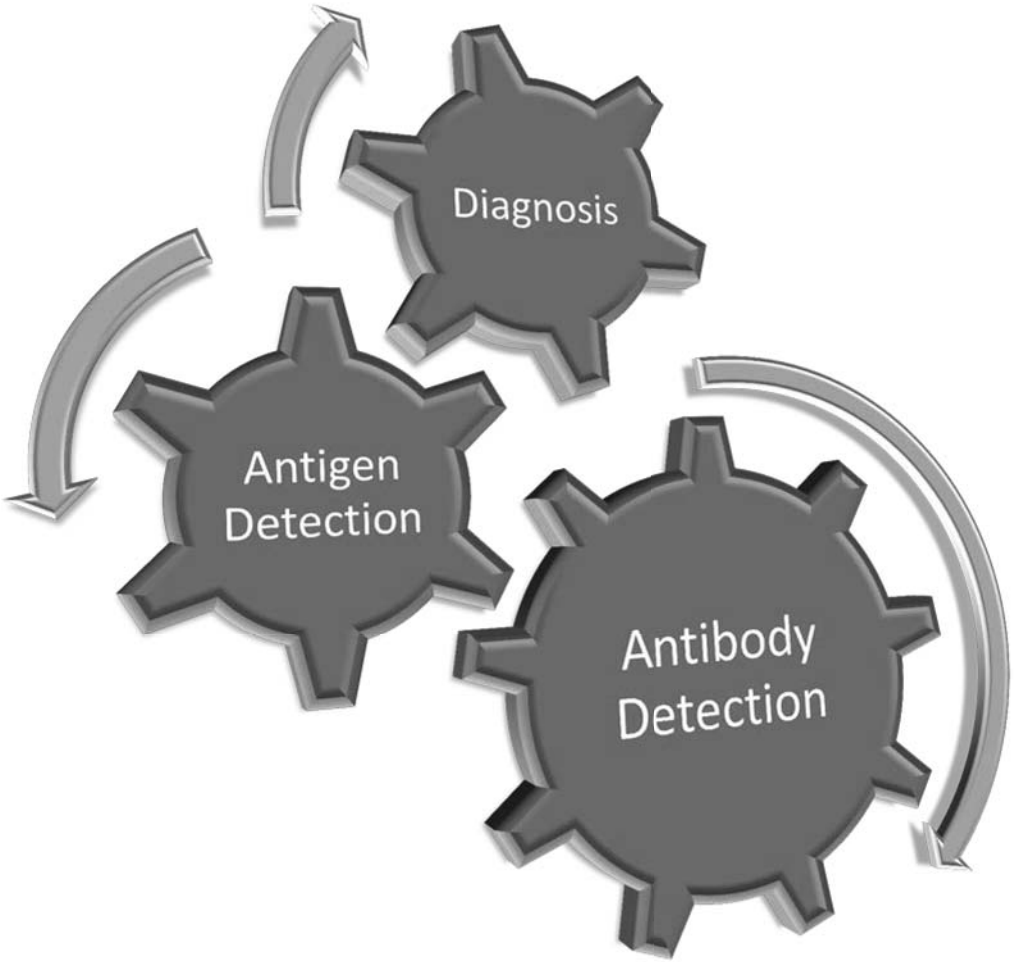
Diagnostic Strategies



Detection of Specific Antigens is Definitive and Preferable to Serological Procedures

- Isolation and culture
- Observation by microscopy
- Detection of pathogen-specific nucleic acid (PCR)
  - Example: TB (Hains, GeneXpert)
  - serology is of no practical value but all other identification used.

Limitations of Serological Procedures

- **Many antigenic sub-types:**
  - *Streptococcus pneumoniae* (90)
  - Adenoviruses (52)
  - Rhinoviruses (110)
- **High pre-existing levels of Abs:**
  - Immunisation
  - Endemic disease (Malaria)
  - Occupation
- **Ab production compromised:**
  - Transiently, as in neonates and in those receiving immunosuppressive therapy
  - Permanently, as in primary and acquired Ab-deficiency syndromes
  - •Acute phase of the disease precedes the production of specific antibodies
  - Not all infections induce systemic Ab response

Serodiagnosis is of Value in:

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Syphilis

- Brucellosis
- Pneumonia caused by *Mycoplasma pneumoniae*.
- Chlamydial diseases
- Rickettsial diseases
- Toxoplasmosis
- HIV and HV infections

Acute / Chronic Infection

Acute

- **IgM:** Detectable within days
  - Peak at 7-10 days
- **IgG:** Detectable 7-14 days after onset of infection
  - Detectable levels stay in circulation for months.

NB. *Increases in titer in follow-up samples must be shown to confirm active infection (retest in 4-6 weeks)*

Chronic

- **IgG:** significant increase in titer (4-fold above basal)

*Chlamydial serology: IgG, IgA, IgM

Serological Procedures which can Detect Different Types of Antibodies

- **Indirect Immunofluoresence (IIFA)**
  - Glass slide coated with Ag
  - Fluorochrome conjugated to anti-human Ig
  - UV microscope

- **Enzyme Linked Immunoassay (ELISA)**
  - Microtiter well coated with Ag
  - Enzyme conjugated to anti-human Ig
  - Colour change measured by spectrophotometer

Syphilis

Difficult to isolate and culture

Serology effective for diagnosis and monitoring treatment

	RPR	TPHA	FTA Abs	
			IgG	IgM
1	1:4	Neg	Neg	Neg
2	1:64	Pos	P+++	P+/Neg
3	Neg/NR	Pos	P++	P+
4	Neg/NR	Neg	Neg	Neg
	Cardiolipins	*Treponema pallidum*		

Chlamydia

C. psittaci, C. trachomatis, C. pneumoniae
Obligate intracellular organism
IIFA IgG, IgA, IgM Serology

***Chlamydia pneumoniae* Serology**			
	IgG	IgA	IgM
1	1:128	1:16	1:20
2	1:512	1:64	Neg
3	1:64	Neg	Neg
Normal Values: IgG: <1:64, **IgA:** <1:16, **IgM:** <1:10			

Tick byte fever

R. conorii, R. typhi, R .rickettsii, C. burnetii
Very small rods, difficult to observe or stain
Intracellular organism

***Rickettsia spp.* Serology**		
	IgG	**IgM**
1	1:128	1:64
2	1:152	Neg
3	Neg	Neg
Normal Values: IgG: <1:64, **IgM:** <1:64		

Tick byte fever *cont.*

C. burnetii

aka Q-fever influenza-like symptoms, pneumonia ensues in 50% of cases

***Coxiella burnetii* Serology**				
	Phase II		Phase I	
	IgG	**IgM**	**IgG**	**IgM**
1	1:512	1:256	Neg	1;64
2	1:128	Neg	1:128	1:512
Normal Values: IgG: <1:64, **IgM:** <1:64				
	Phase II titers > Phase I: **Acute infection**			
	Phase I titers > Phase II: **Chronic infection**			