DIAGNOSTICS 5
ANTIBODIES AS DIAGNOSTIC TOOLS:
Immunology in Diagnostics

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**Key Concepts**

* Following infections, patients’ sera contain antibodies, some of which may neutralise the infective agent
* There are different classes of antibody proteins – immunoglobulins (Igs) with overlapping and unique functions
* The high degree of specificity of antibodies for their target antigens is the basis of many diagnostic tests.
* The ability to immunise animals to obtain antibodies with defined specificities
* Coupling of reporter molecules to antibodies
* Hybridoma technology and monoclonal antibodies
* Genetically engineered antibodies
* Therapeutic antibodies

**TECHNOLOGY**

* **Antibody Manufacture**
	+ Polyclonal antibody production
	+ Monoclonal antibody production
	+ Engineered antibodies
* **Antigen-Antibody Interaction**
	+ Immunoprecipitation
	+ Haemagglutination
	+ Agglutination
* **Labeling with reporter molecules**
	+ Radioisotopes
		- Radioimmunoassays (RIA)
		- Autoradiography
	+ Enzymes
		- Enzyme-linked immunoassays (ELISA)
		- Immuno-enzyme staining
	+ Fluorescent probes
		- Fluorescent microscopy
		- Flow Cytometry
	+ Magnetic Beads
		- Cell separation
	+ Coloured Beads
		- Luminex assays

**USE OF MANUFACTURED ANTIBODIES**

**Therapeutic**

* Prophylactic protection against microbial infection
* Anti-cancer therapy
* Removal of T-cells from bone marrow grafts
* Block cytokine activity

**Diagnostic**

* Tissue typing
* Blood group serology
* Immunoassays
	+ Hormones
	+ Antibodies
	+ Antigens
* Immunodiagnosis
	+ Infectious diseases

**ANTIBODIES IN CLINICAL PRACTICE**

**Clinical Immunology**

* Immunodeficiency
* Malignancy
* Autoimmunity
* Inflammation
* Tissue typing and transplantation

**Pathology**

* Clinical Chemistry
* Haematology and Blood Transfusion
* Medical Microbiology
* Histopathology

**Antibodies produced by the patient**

**Manufactured antibodies**

**BACK TO THE CASE:-**

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| **Signs & Symtoms** | **Immunological Concerns** |
| * vague aches and pains
* Loss of appetiteWeight loss
* “Glands” up in his neck
* Fever, rash, small red patches, some lumpy
* Diarrhoea
 | * Immune complexes
* Effect of poor nutrition on bone marrow cells
* Immune activation
* Acute Phase, activation, complexes
* Protein-losing enteropathy
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| **Immunological Work Up** |
| **First Line Tests*** FBC and differential
* CRP, ESR, etc.
* Immunoglobulins
* Complement C3 & C4
* Lymphocyte subsets
* Autoantibody screening tests
 | **Second Line Tests*** Complement Functions
* Specific antibodies
* Neutrophil functions
* Lymphocyte functions
* Molecular tests
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Useful link

A website created for the annual Schools Science Conference project and showing how a modern Immunology Lab functions:

 [http://www.science4u.info/virtuallab/index.htm](%20http%3A/www.science4u.info/virtuallab/index.htm)