Course: Immunology

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Lecture: Monoclonal Antibodies

Monoclonal Antibodies

Principles for Monoclonal and polyclonal Abs production

Monoclonal Antibodies are made by immunizing animals (mouse, rabbit, goat, horse, etc.) with purified Ag. The animal responds by producing Abs that specifically recognize and bind to the Ag (single specificity). Polyclonal Abs are produced in multiple animal species e.g. rabbit, horse, goat, and chicken and wide reactivity but lower specificity when compared with monoclonal Abs.

Polyclonal Abs have the advantage (comparing with monoclonal antibodies) in that they can react to multiple epitopes of the target protein. The disadvantage is the cross-reactivity with similar epitopes in other proteins and give false positives.

Monoclonal Abs are produced mostly in mice. Köhler and Milstein developed the technology of monoclonal Ab production. Mice are injected with purified immunogen (Ag). After an immune response has been achieved, the B lymphocytes (Ab-producing cells) are harvested from the spleen. Because isolated B-cells have a limited life span, they are fused with mouse myeloma cells.

The hybrid cell produced (hybridoma) is an immortal cell that produces Igs specific for a single epitope (monoclonal Abs). The advantage of monoclonal Abs is their higher specificity when compared with polyclonal Abs. Hybridomas can be kept in cell cultures (highly pure Ab but at low concentration). The commercial catalogs usually includes the host (animal in which the Ab was produced e.g., mouse, rabbit).

- **Some vaccines that use monoclonal Abs:**

1. Tetanus
2. Rabies

- **Some Immunological techniques and that use monoclonal Abs:**

1- ELISA, all types.
2- Immunohistochemistry.
3- Immunotherapy.
4- Flow Cytometry.
5- Biosensors.
6- Affinity chromatography.
7- Immunological Tests for infections like *Salmonellosis* and *Brucellosis*.