

Introduction to Hybridoma Techniques

Antibodies

highly specific proteins - bind to "antigens"

specificity is a very important property of antibodies

some uses of antibodies

[Antibodies and therapy](#)

[New Developments in Monoclonal Antibodies Are Hopeful](#)

- differentiate between very similar molecular structures
- detect presence of various molecular structures
- diagnose and treat certain cancers
- neutralize biological toxins (e.g., tetanus toxin)
- hundreds of clinical lab tests
- purify mixtures of molecular substances (affinity chromatography)
- identify microorganisms
- detect infected cells
- selectively eliminate cells
- enhance phagocytosis
- inhibit cellular interactions
- interfere with virus infections

antibodies are produced by stimulated B-lymphocytes

one B-lymphocyte secretes antibodies of only one specificity

desire large amounts of a single specific antibody

poly-clonal antibodies (produced *in vivo*)

- mixture of many different antibodies of many different specificities
- many different B-lymphocytes producing antibodies
- limited time for antibody production (animal will eventually die)
- low levels of antibodies (animal normally produces only what is needed by that animal)

expensive to maintain animals

dependent on existing genetics of animal

cannot easily select antibodies with different biological properties

mono-clonal antibodies

eliminate mixture of antibodies by isolating B-lymphocytes in tissue culture

grow one isolated B-lymphocyte ---->one "clone" of identical B-cells

problems encountered

isolated B-lymphocyte will often
not remain viable in culture
don't divide very rapidly
very little antibody is produced

need to "add"

viability in tissue culture
rapid cell division
increased antibody production

tumor cells

many types remain very viable in
tissue culture
most divide very rapidly
but, DON'T produce any antibodies

Combine properties of

B-lymphocyte	+	Tumor Cell
produces antibodies		tissue culture viability rapid cell division

"fuse" B-lymphocyte + tumor cell into one cell

---> "hybrid" cell

culture hybrid cell

continue to grow indefinitely in culture
rapid cell division (produces one "clone")
antibody production (by one[mono] clone)
large amounts of antibodies secreted
can manipulate genetics of isolated
lymphocytes
can select antibodies with certain biological
properties
much less expensive than maintaining
animals

