

# **Mechanism of Action - Monoclonal Antibodies**

**2-Minute Animation for Pfizer**

# Slide 1



Pfizer uses biotechnology to produce monoclonal antibody drugs as therapies.

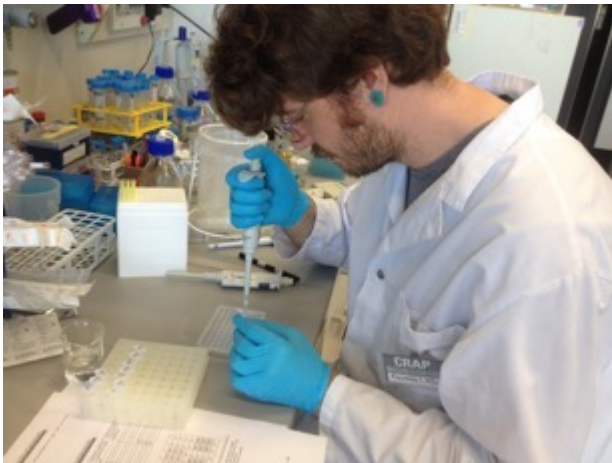
These are produced by recombinant cell lines in large volume bioreactors and purified in a process that can take days.

## 1 Testtube Environment

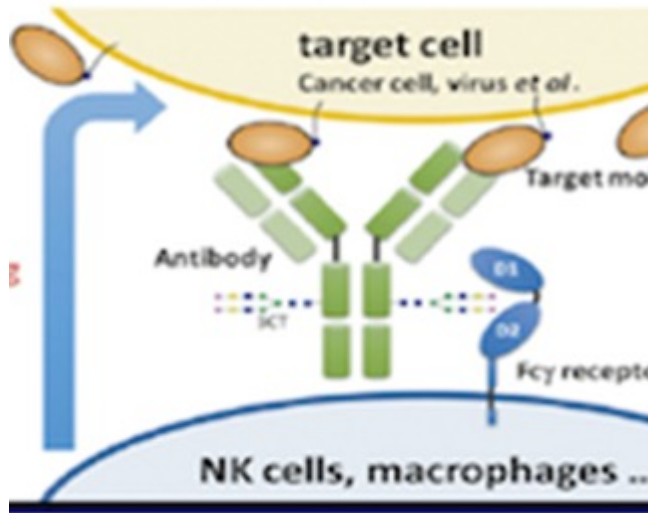
# Slide 2



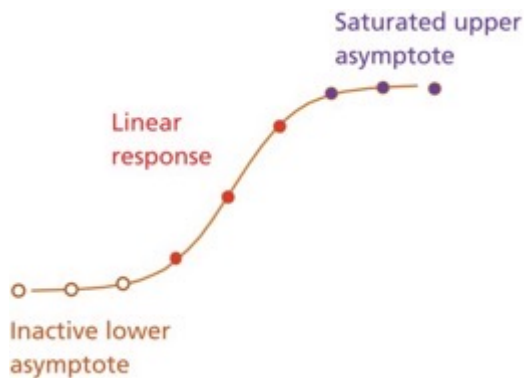
Before the drug is administered to patients, samples are taken and tested in analytical laboratories to assure the proper antibody structure has been produced.



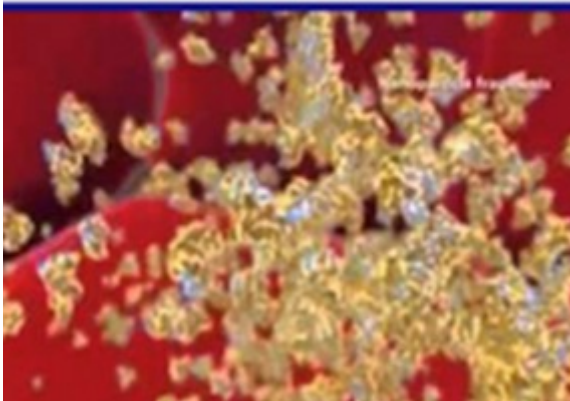
# Slide 3



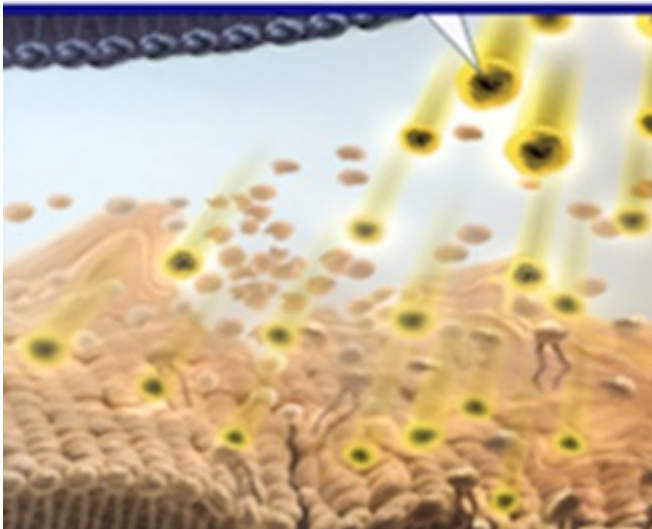
One test is a bioassay that uses cultured cells to show the drug binds and mediates the mechanism of action intended in patients. In this example two cells are involved.



Rotation around to see tumor and antibody hive action - we drive in close



Action of killing target cell



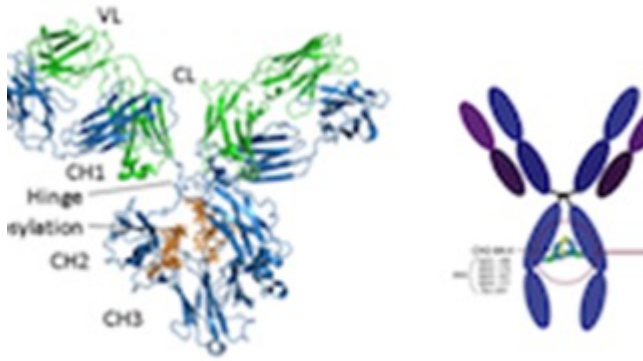
## Slide 4

One mechanism is known as antibody-dependent cellular cytotoxicity, or “ADCC.”

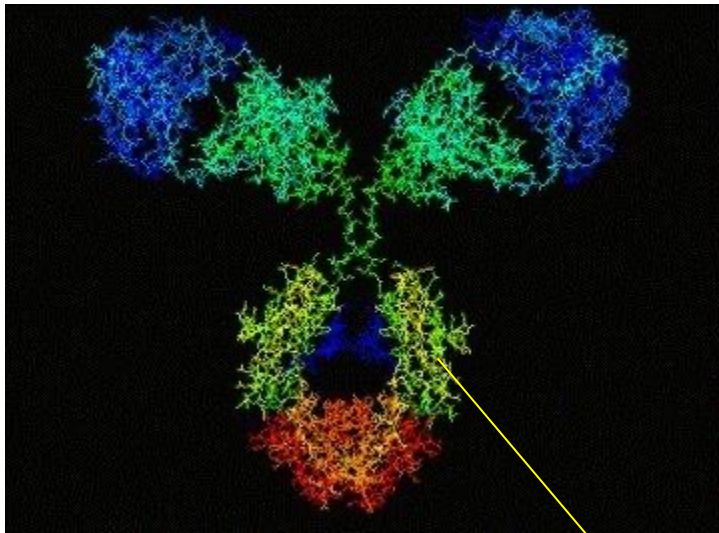
This requires that the antibody bind to a specific target on a tumor cell and to an “effector” cell (for example, a natural killer cell).

The effector cell then releases cytotoxic granules and destroys the tumor cell.

# Slide 5



Antibodies are glycoproteins. During the production process, sugars (or, glycans) are attached.

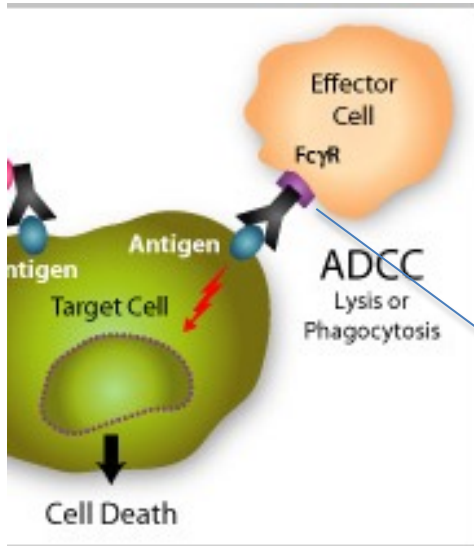


Zoom here for  
sugar (glycan)

One such sugar, fucose, prevents the tight binding of the antibody to the effector cells. Therefore, it has a direct impact on ADCC activity.

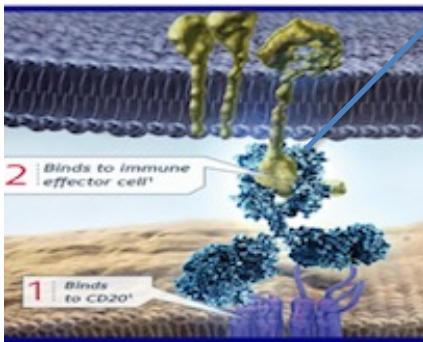
# Slide 6

For these reasons, even a small difference in the amount of a glycan can affect the activity of the drug. This is why it is controlled during production. Analytical testing, including bioassays, assures this structure is consistently produced.

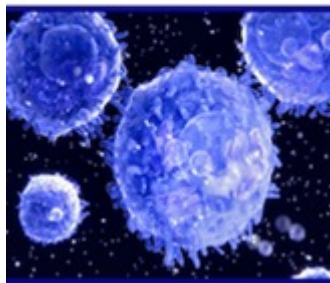


Right here it is “wobbly” ... not latching on tightly.

We see the receptor connection take place: the Mechanism of Action (MOA)



Free floating tumor cell / T-cell found by receptors.



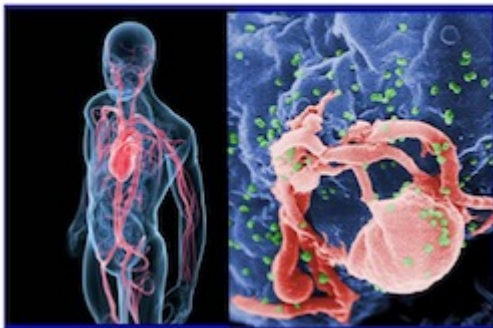
# Slide 7

CERTIFICATE of ANALYSIS					
Mailing Address PO Box 147 Springlet, NC 12345 919.234.567-Office		Shipping Address 720 2 <sup>nd</sup> Street Springlet, NC 12345 919.234.9078-Fax			
Producer certifies that the biodiesel to which this certificate relates is monoalkyl esters of long chain fatty acids derived from plant or animal matter that meets the requirements of the American Society of Testing and Materials D6751-07 with the following analysis of results:					
Property	Test Method	Limits	Units	Analysis	Pass/Fail
Free Glycerin	D 5504	0.020	% mass	0.0004	Pass
Total Glycerin	D 4594	0.240	% mass	0.1140	Pass
Water and Sediment	D 2709	0.050 max	% volume	<0.005	Pass
Sulfur	D 5453	0.0015 max	% mass	0.0008	Pass
The following parameters are tested for periodically with the following typical results:					
Cloud Point	D 2500	REPORT	°C	6.1°C (40°F)	Report
Flash Point (Closed Cup)	D 93	130.0 min	°C	165	Pass
Kinematic Viscosity, 40°C	D 445	1.5-6.0	mm <sup>2</sup> /sec	4.666	Pass
Sulfated Ash	D 374	0.020 max	% mass	0.003	Pass
Copper Strip Corrosion	D 130	140.3 max	-----	19	Pass
Cetane Number	D 813	47 min	-----	51.4	Pass
Carbon Residue	D 4538	0.050 max	% mass	<0.010	Pass
Acid Number	D 664	0.80 max	mg KOH/g	0.31	Pass
Phosphorus Content	D 4951	0.001 max	% mass	0.0005	Pass
Oxidation Temperature	D 1169	360 min	°C	354	Pass

Standard R. Printas

Each test for final product must meet exact specifications to prove the product has the necessary quality attributes.

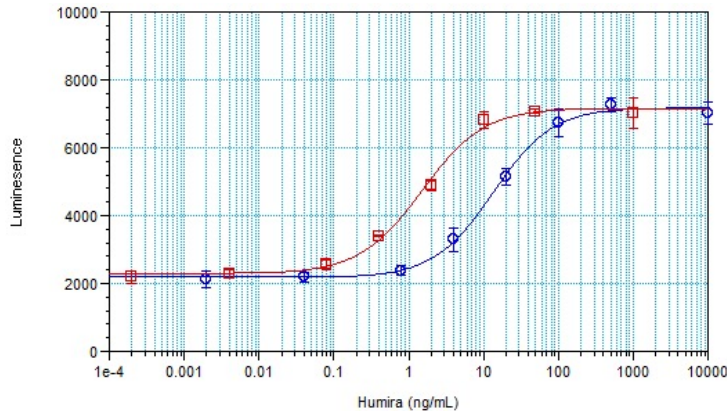
- 2 We enter the human body and drive through veins to enter tumor environment



A bioassay is selected and used as part of lot release in a quality control laboratory.



# Slide 8



Numerous tests are performed to demonstrate each batch of antibody is of consistently high, pharmaceutical-grade quality.

Bioassays compare the functional activity of production lots against a standard. By these means they confirm the product has the necessary structure to provide the intended biological activity, as well as assurance that it is stable on storage.



It is in this way that the needs of our patients are met.