

Parts list, Timing/System
diagram, Testing/Debugging
Sleep-away

Parts

PARTS	
Liposome	DSPE-PEG
Monoclonal Antibody	OX26
Adenosine Deaminase	608958
Adenosine Receptor	ADORA1
Transcription Terminators	TL1
Promoter	PEC3786
Receptor-Associated Protein of Synapse	RAPSN

We can produce these system parts through genetic modification of *e. coli* bacteria

A

Immunoliposomes enter brain.

B

Immunoliposome opens, releases system.

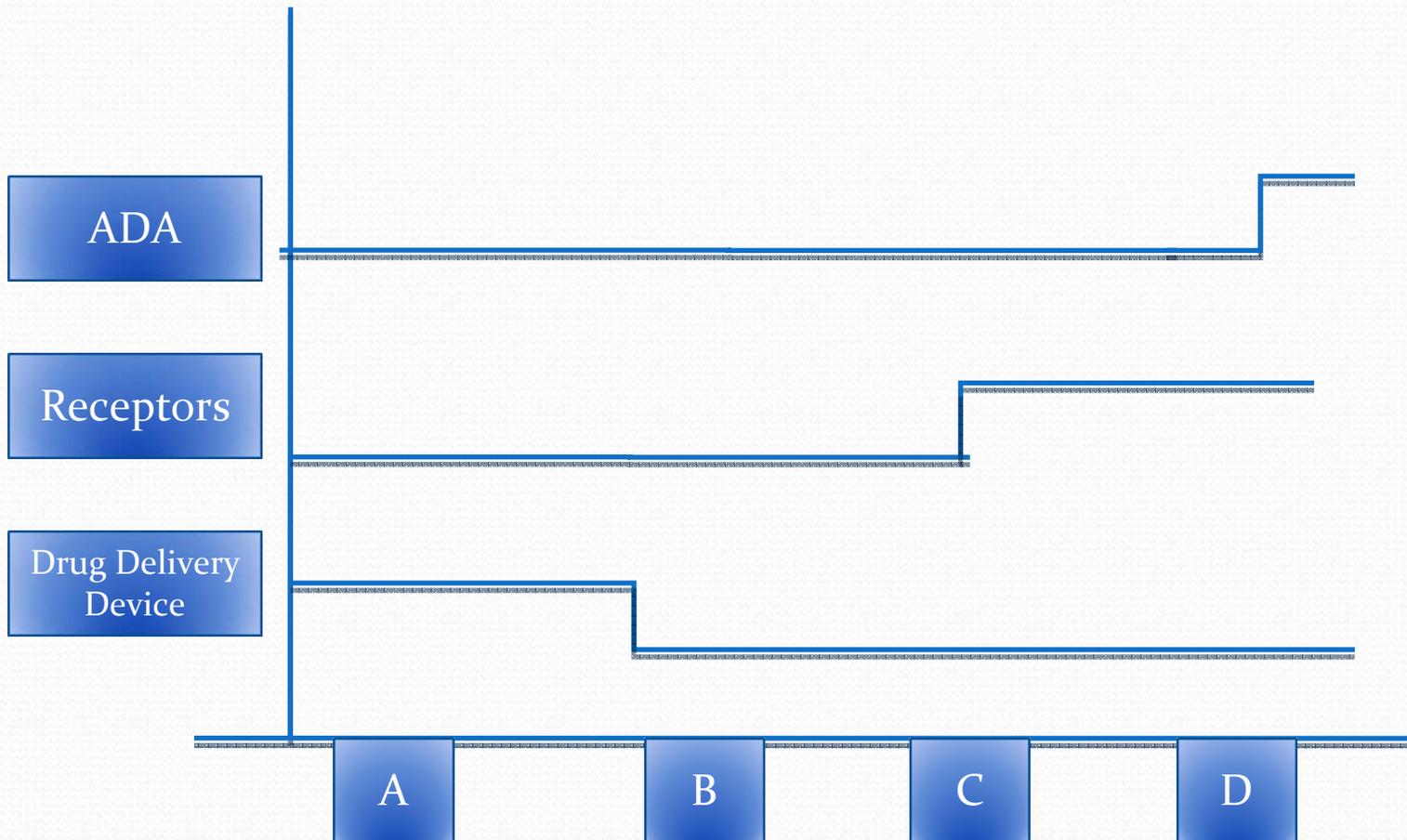
C

Receptors attach to extracellular adenosine

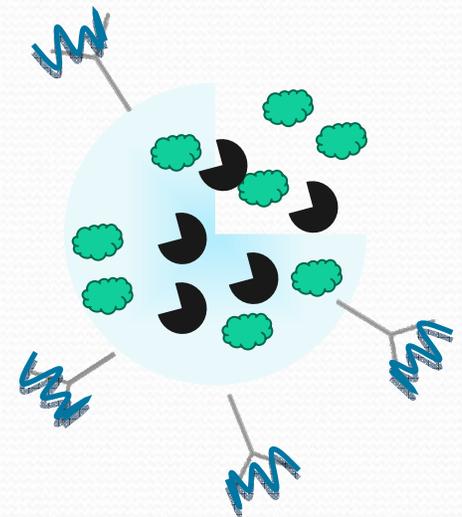
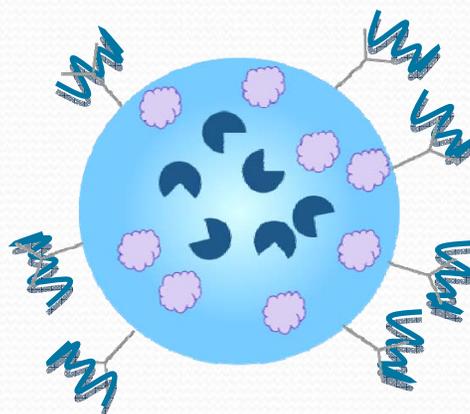
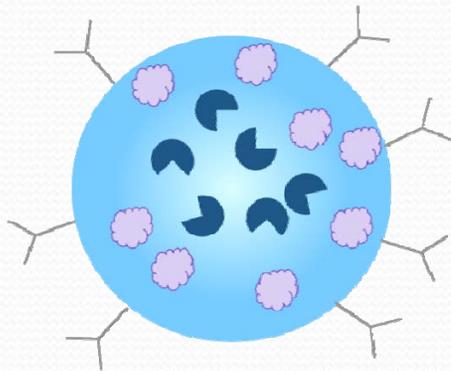
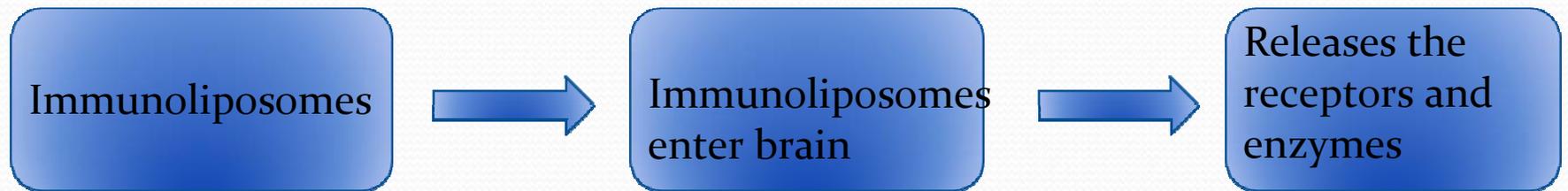
D

ADA breaks down adenosine held in receptors

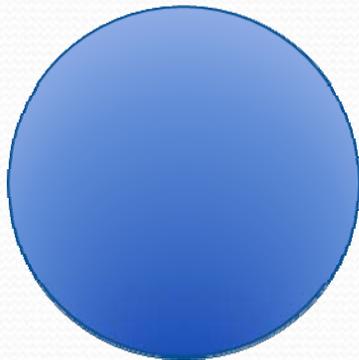
Time Diagram



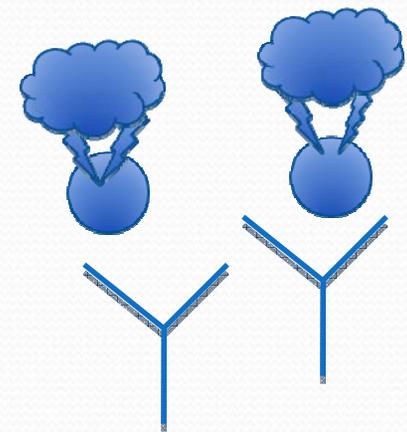
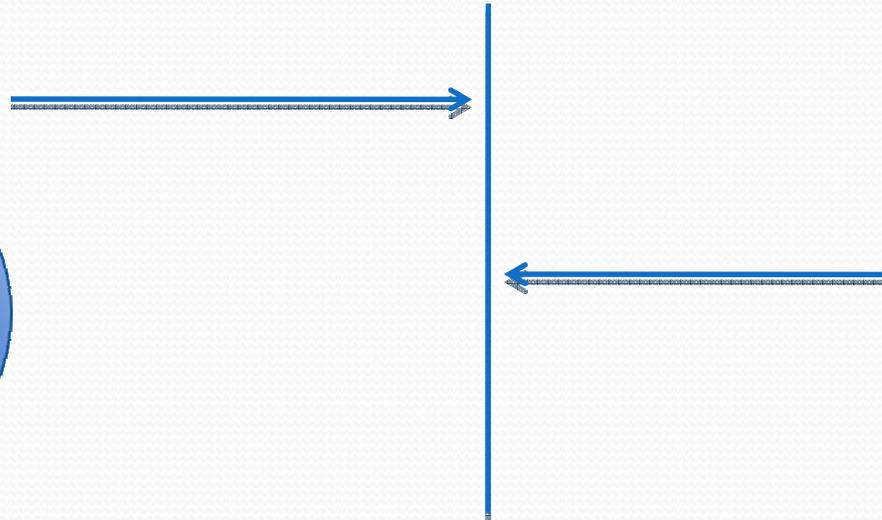
General System Diagram



Device Diagram



Immunoliposome
containing the
enzyme and
receptors



Enzymes and
receptors will
capture and
break down
adenosine

Testing

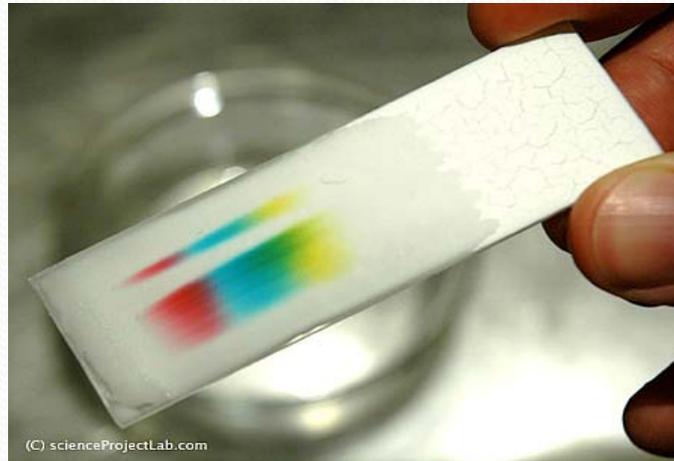
- Testing parts *in vitro*
 - Immunoliposome
 - attaching antibodies
 - inserting receptors and enzyme
 - Adenosine attachment to receptor
 - Effectiveness of ADA

- + Testing system *in vivo*
 - + Trials with mice
 - Drug delivery system
 - Side effects of system components
 - Side effects of delaying sleep
 - + Trials with humans
 - Similar steps

Adenosine Receptor/Enzyme Testing

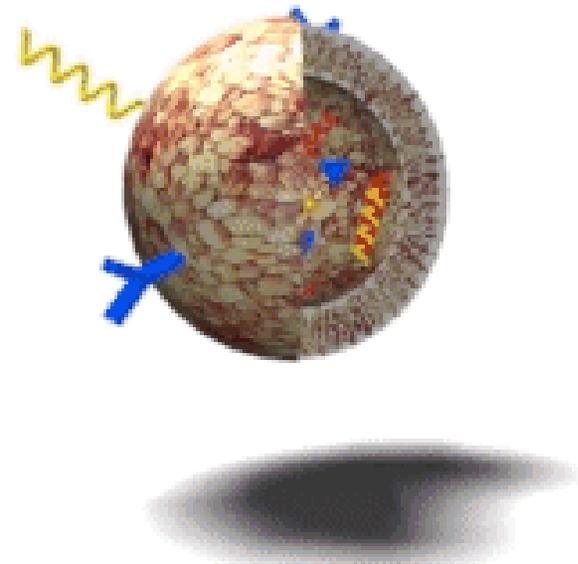
- Adenosine Receptor
 - Add determined amount of receptor to adenosine solution
 - Use chromatography to determine efficacy of receptors

- + Adenosine Deaminase
 - + Create solution with known amount of adenosine
 - + Add ADA, measure change in adenosine levels
 - + Can use methylene blue-based detector for adenosine



Immunoliposome Testing

- Two steps to test:
 - Attach antibodies
 - Insert receptors and enzyme
- Can use chromatography after each step
 - Separates particles by mass
 - Only select immunoliposomes with specific mass (i.e., successful attachment of antibodies or insertion of contents)



3D Model of an Immunoliposome by Dr. R. Rezka, MDC, Berlin and Dr. Reto A. Schwendener

Courtesy of Reto A. Schwendener Ph.D. Used with permission.

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