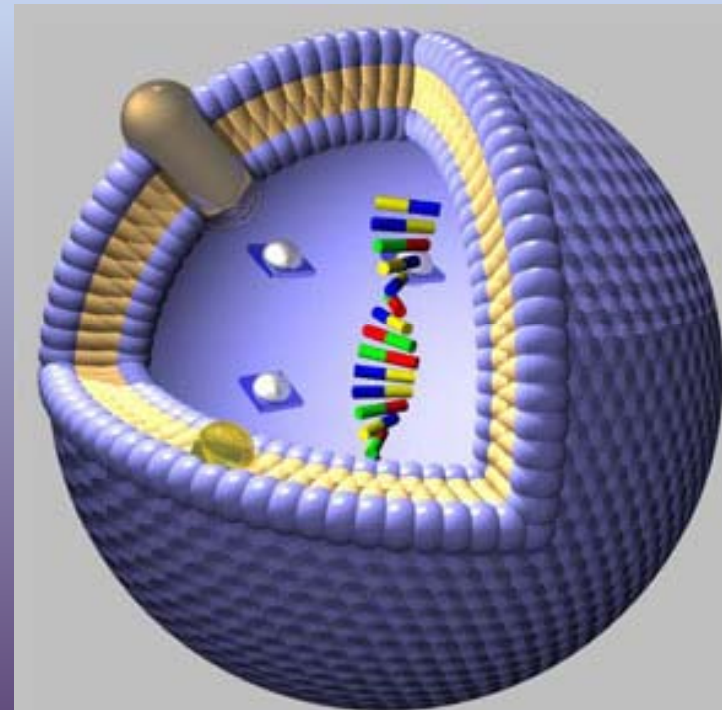


# Nanocapsules

- The body uses little capsules, called “liposomes” to ferry material around.
- Shells are made out of the same material as cell walls, called “lipids.”

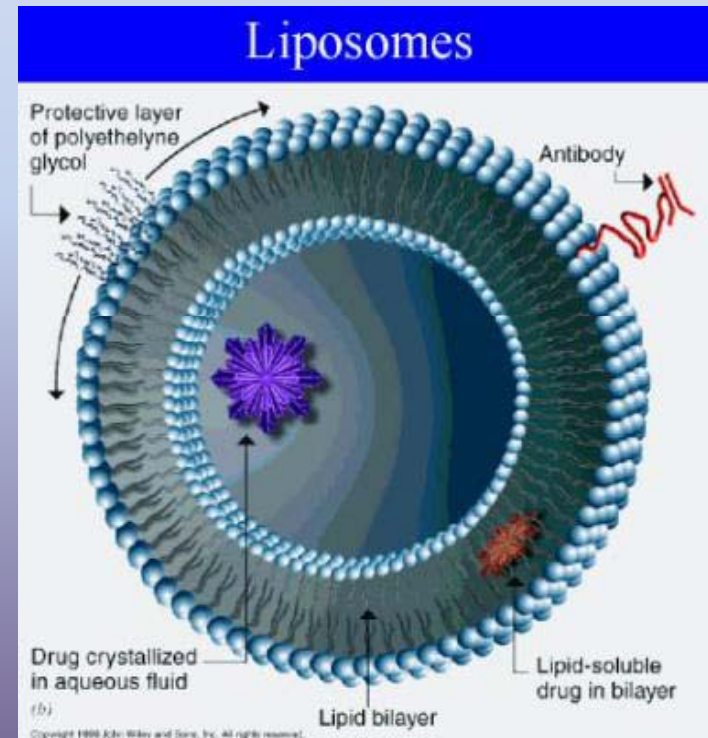
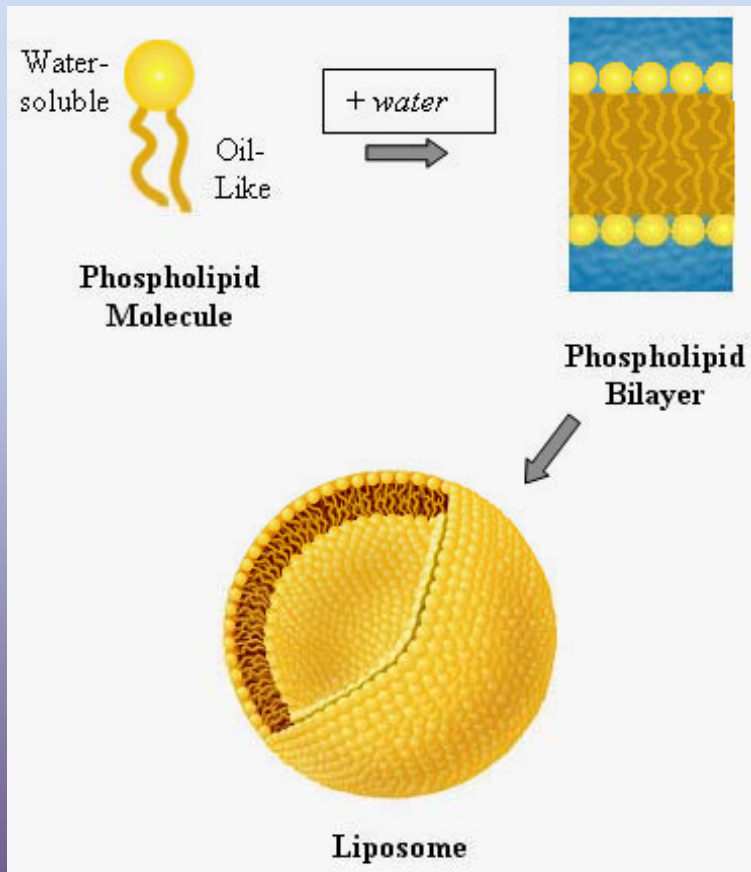
Because cells already use them, they are ideal for **drug delivery** applications.



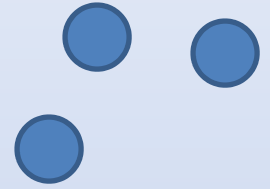
# Making Liposomes

Kind of like making oil & vinegar salad dressing

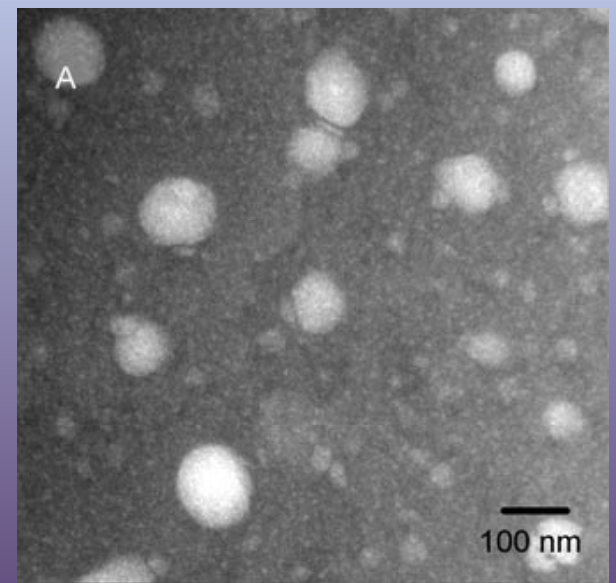
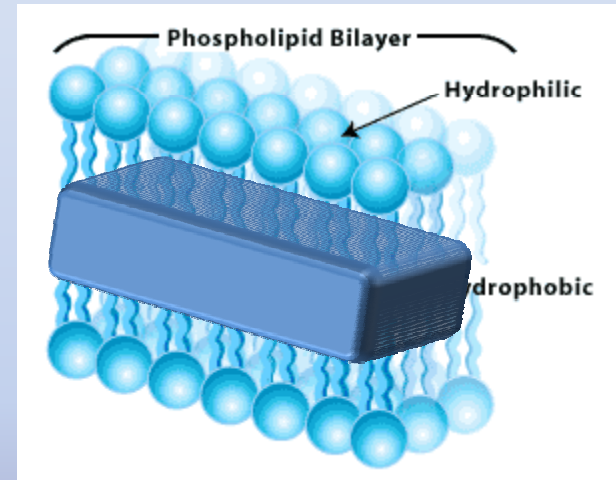
Can then “decorate” and load the capsule



# Polymer Nanocapsules

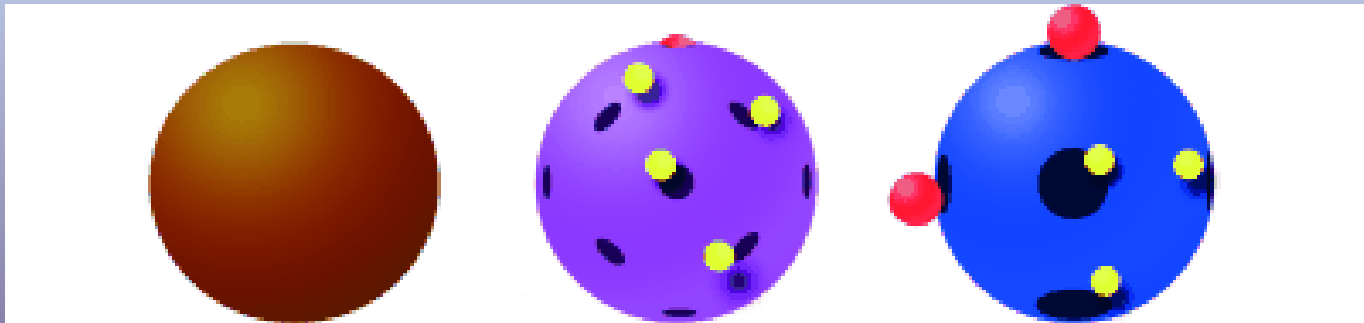


- Can put molecules into the “hydrophobic” (water avoiding) inner part of the shell.
- Then zap molecules with UV light to join them together.
- Remove the liposome material and you have a polymer capsule with the same size as the liposome.



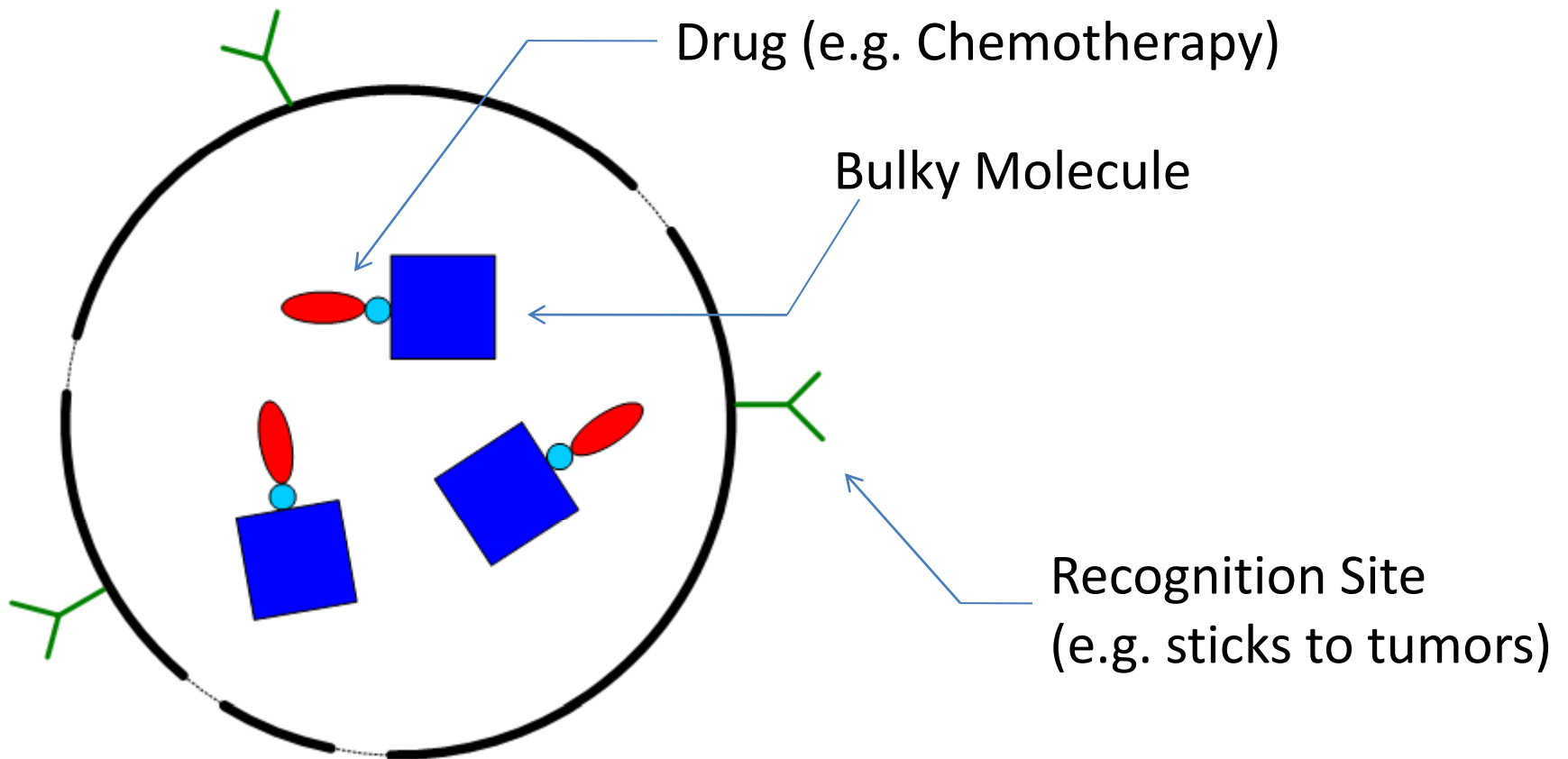
# Nano-Wiffleballs

- Can add holes in the walls to create porous shells.
- Can trap large molecules and release small molecules.



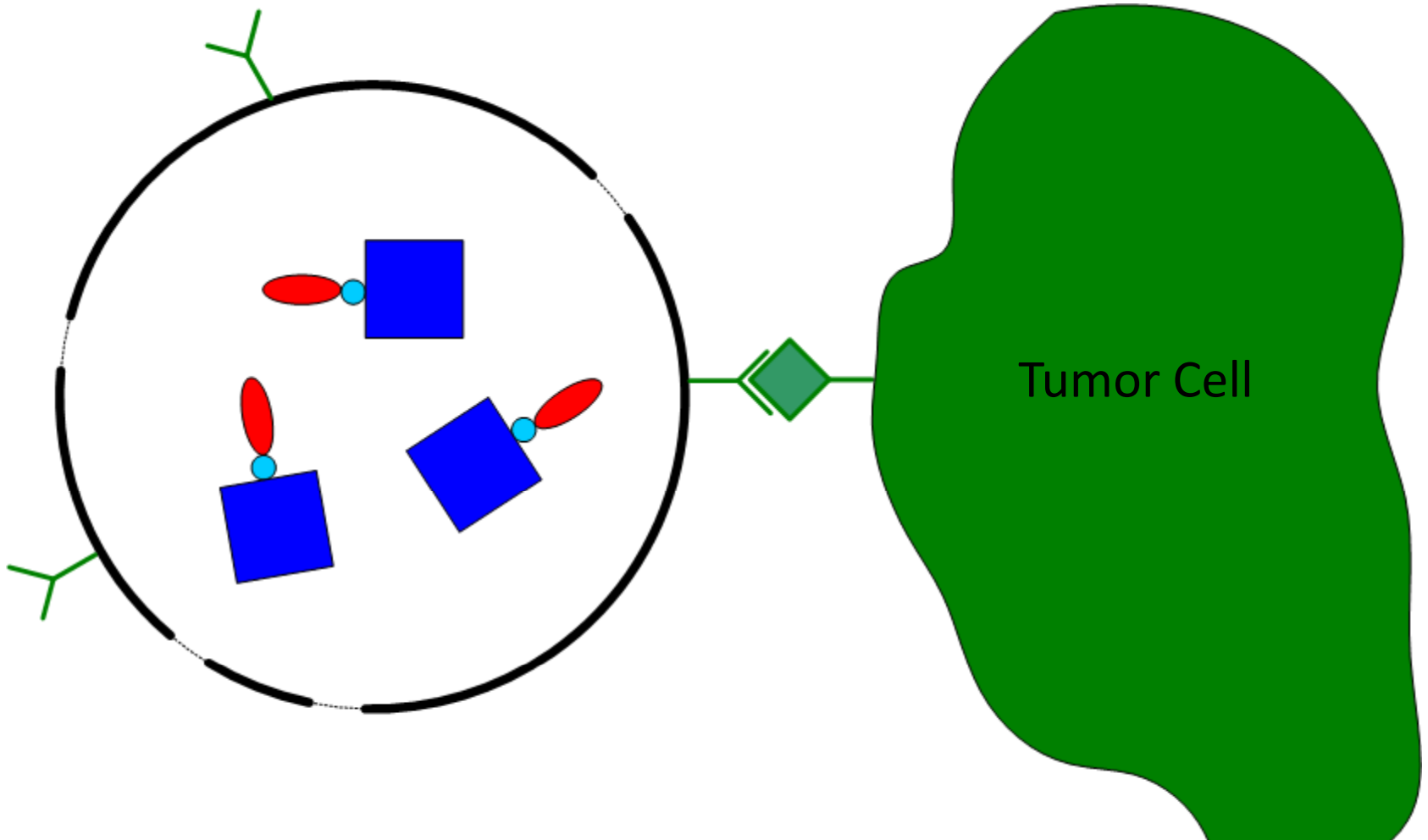
# Drug Delivery

- Fill capsule with deactivated drug



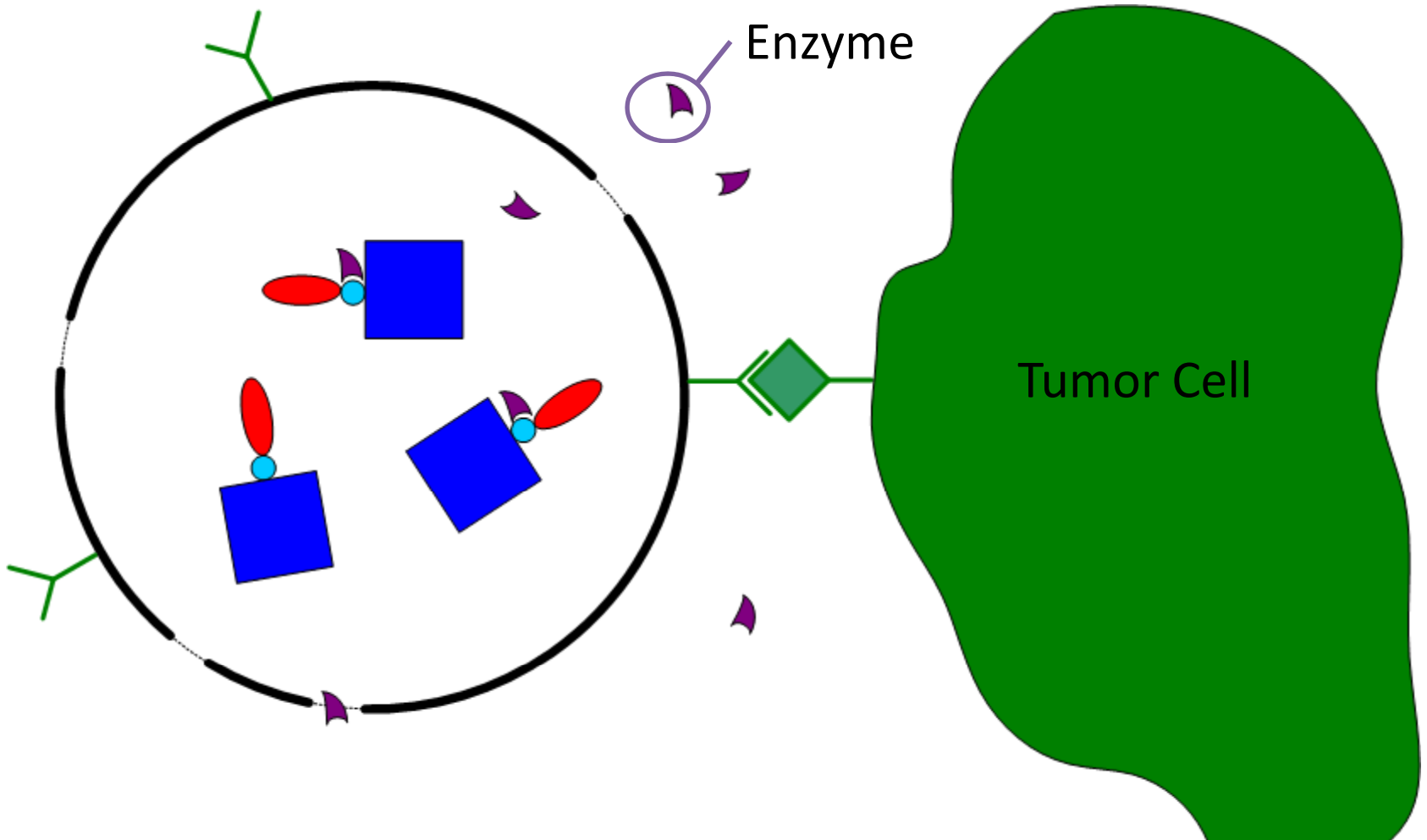
# Drug Delivery

- Let it float around until it finds a target.



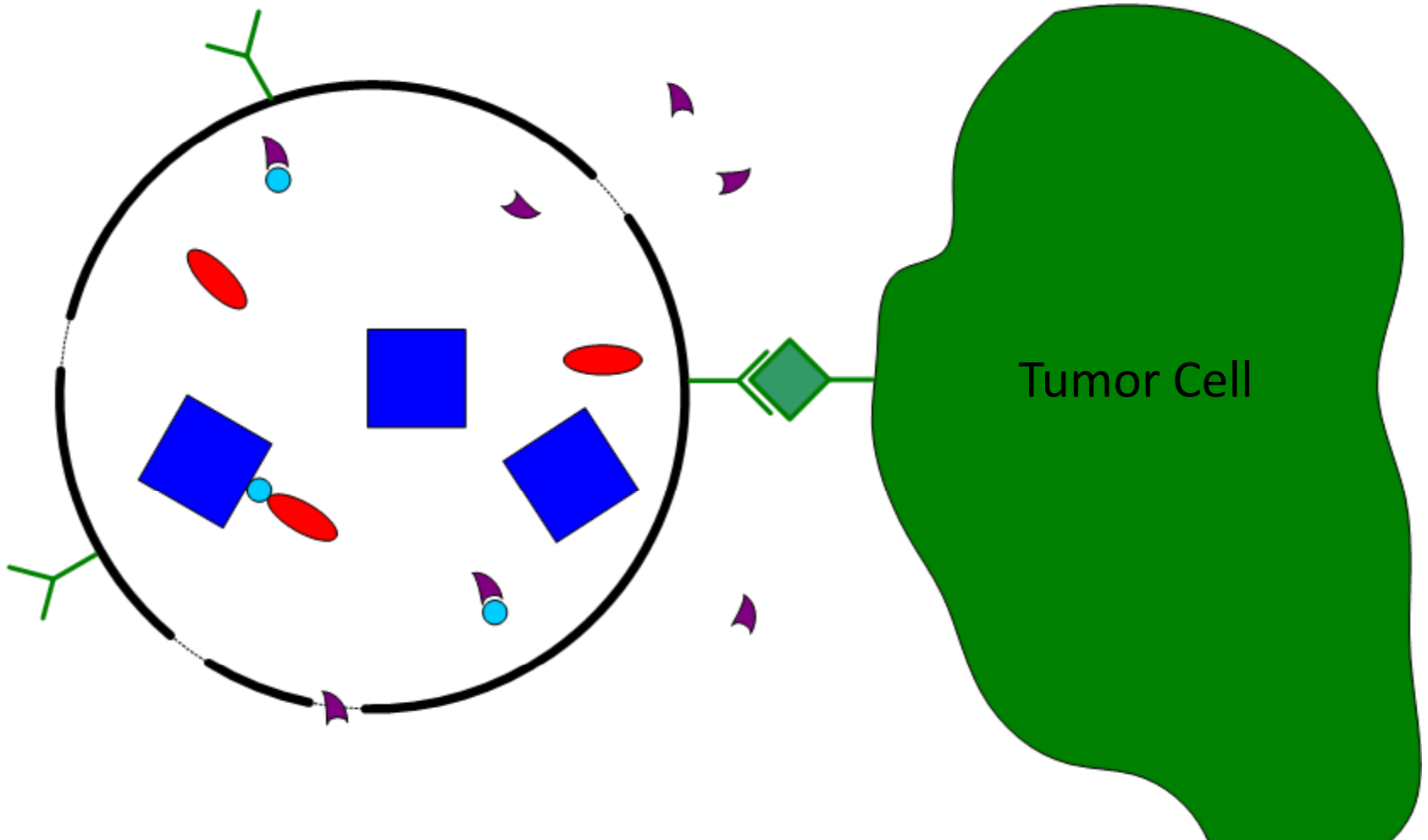
# Drug Delivery

- Introduce an enzyme that breaks off bulky part.



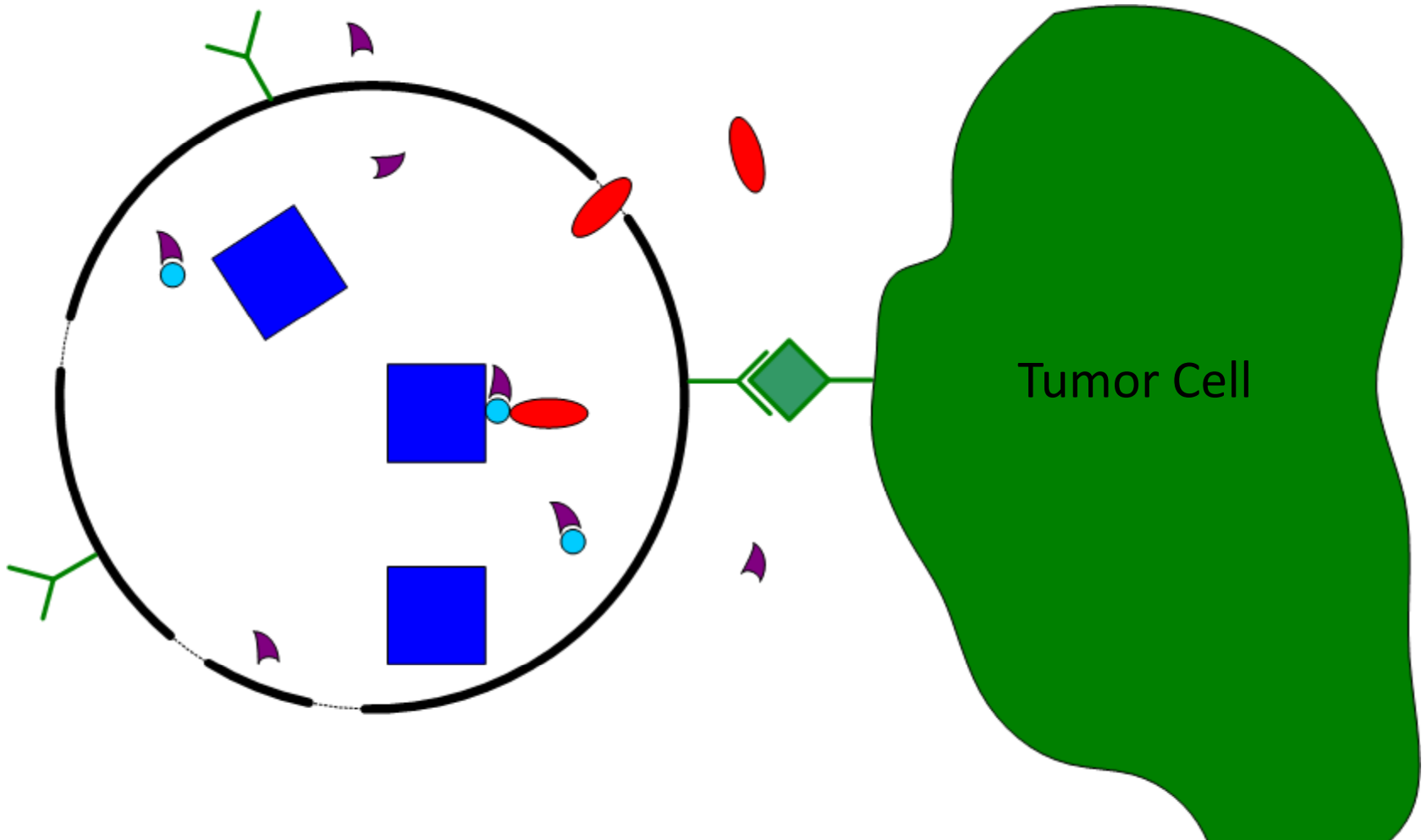
# Drug Delivery

- Drug is now free to escape the capsule...



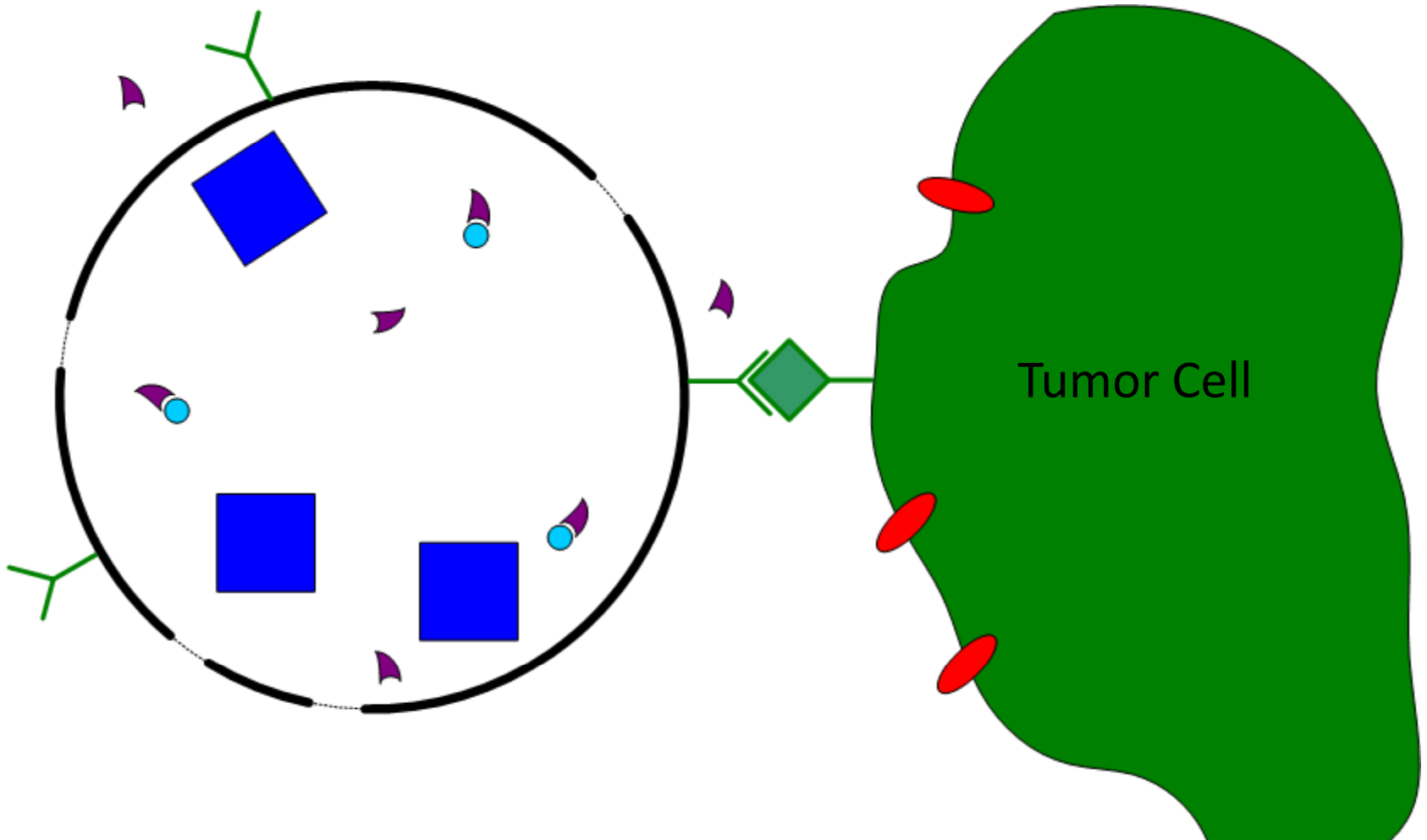
# Drug Delivery

- Drug is now free to escape the capsule...



# Drug Delivery

- ...and attack the target.



# Drug Delivery

- Drugs get where they need to be and nowhere else.
  - No spilling or leaking.
- Robust capsule
  - Can take its time to find the target.
- Correct sized capsule
  - Can find its way through tissues like natural liposome.