

**ONLINE REVIEW CHAT: IB BIOLOGY HL Juniors**  
**1/24/2010**  
**TOPIC: Cells**

6:03:14 PM **MsChien:** WELCOME! This is our online study session. It will be copy and pasted later to be published on [mschien.com](http://mschien.com) for your viewing later. SO: (1) keep it clean and respectful, because I can use anything you say against you later :-D (2) ask questions and help ANSWER questions (3) We will have only one hour, so make it good. Any individual issues should be addressed before or after the chat.

6:03:24 PM **MsChien:** INVITE ANYONE IN OUR CLASS THAT YOU SEE

6:04:37 PM **MsChien:** WE WILL START IN ONE MINUTE

6:06:04 PM **MsChien:** MEANWHILE YOU CAN CHECK THIS OUT:

[http://www.youtube.com/watch?v=4TJc9KMFwZQ&feature=player\\_embedded](http://www.youtube.com/watch?v=4TJc9KMFwZQ&feature=player_embedded)

6:06:10 PM **MsChien:** RECOMMENDED BY OMA

6:06:27 PM **OMA:** is that the cell membrane rap?

6:06:30 PM **MsChien:** YEAH

6:06:36 PM **OMA:** lol =]

6:07:21 PM **MsChien:** \*\*\*READY FOR THE FIRST QUESTION????????????????????\*\*\*

6:07:25 PM **Rachel:** yes

6:07:26 PM **Adam:** yep

6:07:56 PM **MsChien:** What is the concentration gradient?

6:08:23 PM **Adam:** the concentration gradient is the difference in concentration between two areas

6:08:26 PM **Rachel:** the concentration in and out of the cell

6:08:32 PM **MsChien:** ADAM GOOD

6:08:39 PM **MsChien:** RACHEL - MORE DETAILS

6:09:04 PM **Rachel:** the difference in the concentration out of the cell and in the cell

6:09:14 PM **MsChien:** RACHEL YES

6:09:33 PM **MsChien:** What is the difference between osmosis and diffusion?

6:09:34 PM **Rachel:** next

6:09:58 PM **Rachel:** osmosis is the movement of water through the semi permeable membrane

6:10:03 PM **Adam:** osmosis is the diffusion of water specifically across a cell membrane, while diffusion is anything else

6:10:13 PM **Rachel:** and diffusion is the same except with particles

6:10:16 PM **MsChien:** RACHEL AND ADAM YES

6:10:23 PM **Adam:** moving across said membrane

6:10:31 PM **MsChien:** WHO IS THAT????

6:10:34 PM **OMA:** kareena

6:10:37 PM **KAREENA:** hi=)

6:10:38 PM **MsChien:** OH OK

6:10:41 PM **MsChien:** SOMEONE TRY TO GET MADDIE IN!

6:11:04 PM **MsChien:** HARD QUESTION: What type of protein generally attaches to another protein on the cell membrane on one side of the cell?

6:11:43 PM **Rachel:** did you teach us this?

6:11:49 PM **Adam:** i dont think she did

6:12:12 PM **Rachel:** i do not recall you ever teaching us tis ms chien

6:12:16 PM **Rachel:** this\*

6:12:17 PM **Adam:** im going to guess globular protiens?

6:12:23 PM **MsChien:** YEP

6:12:28 PM **Rachel:** really

6:12:34 PM **Adam:** awright

6:12:36 PM **Rachel:** why not fibrous

6:12:42 PM **MsChien:** LOOK AT THE LIPID BILAYER DIAGRAM IN YOUR PACKETS

6:12:54 PM **Rachel:** yea wouldnt it be structure

6:13:02 PM Rachel: hence fibrous  
6:13:11 PM MsChien: NO  
6:13:16 PM OMA: but globular transports things  
6:13:18 PM Rachel: why?  
6:13:23 PM MsChien: ITS EITHER TRANSMEMBRANE OR INTEGRAL  
6:13:47 PM Adam: is that the answer?  
6:13:51 PM MsChien: NO  
6:13:59 PM Adam: so it is globular  
6:14:29 PM MsChien:  
<http://micro.magnet.fsu.edu/cells/plasmamembrane/images/plasmamembranefigure1.jpg>  
6:14:57 PM MsChien: HARD QUESTION: What type of protein generally attaches to another protein on the cell membrane on one side of the cell?  
6:15:14 PM Rachel: transmembrane or integral  
6:15:23 PM MsChien: WHICH ONE  
6:15:32 PM Adam: transmembrane?  
6:15:37 PM Rachel: integral  
6:15:39 PM Rachel: ??  
6:15:39 PM MsChien: IT ATTACHED TO OTHER PROTEIN WHEN IT WANTS TO COME IN  
6:15:48 PM Rachel: integral  
6:15:58 PM MsChien: INETGRAL IS GOOD  
6:16:00 PM Adam: oh the integral attaches to the transmembrane?  
6:16:01 PM MsChien: I WOULD ACCEPT INTEGRAL  
6:16:03 PM Kris: I'm so confused  
6:16:10 PM KAREENA: me too  
6:16:21 PM MsChien:  
<http://micro.magnet.fsu.edu/cells/plasmamembrane/images/plasmamembranefigure1.jpg>  
6:16:24 PM Rachel: so on the test the answer that would be correct s integral  
6:16:25 PM MsChien: DO YOU SEE THAT IMAGE  
6:16:43 PM Adam: the intagrал attaches to the transmembrane?  
6:17:04 PM MsChien: THE TRANSMEMBRANE GOES THROUGH THE LIPID BILAYER  
6:17:09 PM Rachel: the integral attaches to other proteins to bring them in  
6:17:11 PM MsChien: THE INTEGRAL JUST STAYS ON ONE END  
6:17:11 PM Rachel: right?  
6:17:15 PM MsChien: RACHEL YES  
6:17:16 PM MsChien: GOOD  
6:17:29 PM MsChien: KAREEN DID YOU SEE ALL THAT  
6:17:29 PM Adam: ok, so the answer would be integral protien?  
6:17:38 PM MsChien: THE ANSWER IS WHATEVER MAKES SENSE  
6:17:43 PM MsChien: YES INTEGRAL  
6:17:44 PM KAREENA: i got it!!! i get it!  
6:17:55 PM MsChien: WHAT DOES THE GLYCOPROTEIN DO?  
6:17:57 PM MsChien: LOOK AT THE IMAGE  
6:18:13 PM Adam: does it attract other protiens?  
6:18:23 PM OMA: recieves messages?  
6:18:26 PM MsChien: OMA YES  
6:18:30 PM Adam: ok  
6:18:32 PM MsChien: ADAM TECHNICALLY NO  
6:18:51 PM Rachel: so it receives messages?  
6:19:03 PM MsChien: RACHEL YES  
6:19:08 PM Rachel: ok  
6:19:35 PM MsChien: ADVANCED QUESTION: How does the paramecium eat yeasT cells?  
6:19:48 PM OMA: endocytosis  
6:19:53 PM MsChien: OMA YES  
6:19:55 PM Rachel: through endocytosis  
6:19:55 PM MsChien: !

6:19:58 PM Adam: through phagocytosis?  
6:20:01 PM Rachel: pagocytosis  
6:20:08 PM Rachel: god adam  
6:20:09 PM MsChien: ADAM YES I WOULD ACCEPT THAT ONE TOO  
6:20:26 PM MsChien: What is one difference between the pili and the flagella?  
6:20:27 PM Adam: is that the specific one though, or is endocytosis better?  
6:20:49 PM Adam: there is no difference, they both are used for locomotion  
6:21:21 PM MsChien: ADAM THERE IS A PHYSICAL DIFFERENCE.  
6:21:27 PM OMA: the flagella is one tail like "hair" whereas the pili are multiple "hairs"  
6:21:27 PM KAREENA: yes but isn't one a bunch of little legs and the other one large tail thing??  
yes, i know it doesn't sound smart lol  
6:21:31 PM MsChien: ALTHOUGH THEY ARE BOTH USED FOR LOCOMOTION  
6:22:00 PM MsChien: OMA YES  
6:22:03 PM Rachel: the pili is for allowing transfers between bacteria  
6:22:06 PM MsChien: KAREENA YES  
6:22:15 PM Adam: ok so the pili are like multiple tiny flagella?  
6:22:22 PM OMA: yup  
6:22:27 PM MsChien: SOMEONE INVITE NICK IN  
6:22:28 PM Adam: gotcha  
6:22:29 PM NICK: hi  
6:22:42 PM Rachel: wait so s chien what are they really?  
6:23:01 PM MsChien: FLAGELLA IS LONG  
6:23:02 PM Kris: Nick's here!  
6:23:04 PM MsChien: NOT LIKE CILIA  
6:23:07 PM MsChien: OR PILI  
6:23:16 PM MsChien: A FLAGELLA IS WHIP LIKE  
6:23:28 PM Rachel: what are their functions  
6:23:40 PM OMA: movement of the cell  
6:23:48 PM MsChien: OMA YES  
6:23:53 PM OMA: a flagella propels the cell like the tail of a sperm  
6:23:59 PM MsChien: IVITE PEOPLE IN THE ROOM IF YOU SEE THEM  
6:24:03 PM MsChien: OMA YES!  
6:24:09 PM OMA: the pili or cilia move in smaller crawl like motions  
6:24:13 PM NICK: pili are used to attach to other cells for sex  
6:24:17 PM MsChien: OMA EXCELLENT  
6:24:24 PM Rachel: o  
6:24:32 PM MsChien: NICK YES.... THEY ARE NOT QUITE AS SMALL AS CILIA BUT NOT QUITE AS LONG AS FLAGELLA  
6:24:40 PM Rachel: ok  
6:25:24 PM MsChien: What is the function of the golgi apparatus?  
6:25:24 PM NICK: can we do some organelle review?  
6:25:31 PM MsChien: OK  
6:25:36 PM OMA: to synthesis protiens  
6:25:41 PM Adam: it is the organelle that is in charge of shipping thing throughout the cell  
6:25:51 PM MsChien: OMA WHICH PART?  
6:25:53 PM MsChien: ADAM YES  
6:26:02 PM NICK: okay  
6:26:03 PM OMA: the ribosomes?  
6:26:05 PM MsChien: How is the endoplasmic reticulum important to protein synthesis?  
  
6:26:12 PM NICK: thats all we need to know about it?  
6:26:14 PM MsChien: OMA YES, RIBOSOMES HELP PERFORM PS  
6:26:21 PM MsChien: YES  
6:26:33 PM Adam: the endoplasmic reticulum is equivelent to a road that the items shipped from the golgi apparatus move on  
6:26:49 PM MsChien: OK

6:26:54 PM NICK: so the ribosomes move on the ER?  
6:27:00 PM MsChien: YES  
6:27:24 PM MsChien: What types of molecules do the mitochondria and chloroplast make?  
6:27:45 PM OMA: atp  
6:27:46 PM NICK: ATP molecules  
6:28:13 PM NICK: will we have to know anything about the scientists?  
6:28:14 PM MsChien: GOOOOOD  
6:28:24 PM MsChien: YES  
6:28:32 PM Rachel: like?  
6:28:40 PM MsChien: NAME SOME  
6:28:48 PM Rachel: schwann  
6:28:52 PM Rachel: hook  
6:28:53 PM MsChien: YES AND WHAT DID HE DO  
6:29:02 PM OMA: schwann cells  
6:29:10 PM Rachel: contributed to the cell ttheory  
6:29:23 PM Adam: hooke found cells in cork with his microscope  
6:29:32 PM MsChien: GOOD GOOD  
6:29:43 PM Adam: and schwann said animals were also made of cells  
6:29:59 PM Rachel: right animolecules  
6:30:02 PM MsChien: GOOOOOD  
6:30:15 PM NICK: how is the question going to be stated ms chien?  
6:30:37 PM MsChien: DESCRIBE THE CONTRIBUTION OF XXXXXXXX IN THE CELL THEORY.....  
6:31:01 PM MsChien: [http://www.sinauer.com/cooper/4e/micro/01/01-02\\_AnimalCell%28L-Large%29.jpg](http://www.sinauer.com/cooper/4e/micro/01/01-02_AnimalCell%28L-Large%29.jpg)  
6:31:03 PM NICK: oh okay i see  
6:31:15 PM MsChien: MAKE SUR EYOU KNOW HOW TO ID ORGANELLS ON A ELECTRON MICROGRAPH  
6:31:20 PM MsChien: YOU HAVE ANOTHER VERSION IN YOUR PACKET  
6:31:35 PM NICK: so you will give us one of their names and we have to describe their accomplishments  
6:31:53 PM Rachel: what was the question  
6:31:57 PM MsChien: YES  
6:31:58 PM Rachel: like restate it  
6:32:05 PM Rachel: please  
6:32:06 PM NICK: all i know is that the nucleoid is lighter colored  
6:32:14 PM MsChien: Name two types of molecules that can diffuse through the cell membrane through passive diffusion?  
6:32:25 PM OMA: glucose and water  
6:32:25 PM Rachel: sucrose  
6:32:26 PM Adam: glucose  
6:32:28 PM KAREENA: H2O AND GLUCOSE  
6:32:30 PM Adam: surcose  
6:32:30 PM Rachel: and water  
6:32:34 PM MsChien: OK  
6:32:49 PM MsChien: How does a cell's surface-to-volume ratio help it obtain a lot of nutrients?  
6:33:06 PM KAREENA: THE HIGH THE SURFACE TO AREA...THE MORE NUTRIENTS IT CAN ABSORB?  
6:33:09 PM MsChien: THAT QUESTION IS ALSO A HINT ON A SPECIAL EXTRA CREDIT QUESTION ON THE TEST  
6:33:13 PM OMA: the larger the SA:V ratio the more nutrients it can absorb  
6:33:15 PM MsChien: KARENA YES  
6:33:19 PM MsChien: OMA YES  
6:33:21 PM MsChien: BEAST.  
6:33:23 PM Adam: the larger the surface to volume ratio, the more nutrients can be absorbed  
6:33:25 PM NICK: the higher the surface area, the more it can absorb

6:33:27 PM MsChien: ADAM YES  
6:33:29 PM NICK: like sponges  
6:33:29 PM MsChien: NICK YES  
6:33:31 PM MsChien: YES  
6:33:42 PM MsChien: THERE WILL BE AN EXTRA CREDIT QUESTION ON THE EXAM  
6:33:49 PM Rachel: finally  
6:33:55 PM MsChien: IT WILL BE SUPER HARD  
6:34:01 PM NICK: not for nh  
6:34:03 PM MsChien: ONLY A BEAST CAN ANSWER IT  
6:34:09 PM OMA: lol niuuuuuuuuice  
6:34:15 PM Rachel: whats it worth  
6:34:17 PM Adam: well its a good thing we have a couple in the class then  
6:34:18 PM Kris: nh is too lazy to type his own name  
6:34:19 PM MsChien: 5 EXTRA POINTS  
6:34:24 PM Rachel: ok\  
6:34:29 PM Rachel: next question  
6:34:46 PM MsChien: How might endocytosis be important for someone with an infection?  
6:35:11 PM Adam: the white blood cells use endocytosis in order to consume harmful bacteria  
6:35:17 PM NICK: take in antibiotics  
6:35:20 PM Adam: and other stuff  
6:35:20 PM MsChien: ADAM GOOD  
6:35:37 PM NICK: con we go over polarity of a membrane and how that effects what can pass through?  
6:35:39 PM MsChien: NICK: THATS USUALLY DONE THROUGH LOCK AND KEY ON THE CLL MEMBRANE  
6:35:57 PM MsChien: OK  
6:36:15 PM MsChien: Which part of a phospholipid is hydrophilic?  
6:36:17 PM MsChien: START WITH THAT  
6:36:23 PM NICK: outside  
6:36:32 PM Adam: the outer part  
6:36:32 PM Rachel: the head  
6:36:34 PM MsChien: SO THAT AREA WOULD BE POLAR OR NONPOLAR  
6:36:34 PM OMA: the head of the bilayer  
6:36:36 PM MsChien: ?  
6:36:40 PM Rachel: polar  
6:36:42 PM OMA: polar  
6:36:44 PM MsChien: RACHEL GOOD  
6:36:44 PM Adam: polar  
6:36:46 PM NICK: polar  
6:36:47 PM MsChien: GOOOOOOOOOOOD  
6:36:52 PM MsChien: Which part of the phospholipid is hydrophobic?  
6:36:56 PM OMA: the tail  
6:36:57 PM Rachel: the tail  
6:36:58 PM KAREENA: THE INSIDE  
6:37:01 PM MsChien: AND THAT WOULD BE .....?  
6:37:04 PM NICK: inside, fatty acid tail  
6:37:05 PM Rachel: nonpolar  
6:37:07 PM MsChien: GOOD  
6:37:09 PM Adam: nonpolar  
6:37:22 PM MsChien: WOULD BE HEADS FACING THE INSIDE OF A CELL BE POLAR OR NON POLAR  
6:37:33 PM Adam: polar  
6:37:34 PM NICK: so water can slip through because it is polar?  
6:37:38 PM MsChien: ADAM YES  
6:37:54 PM MsChien: THE INSIDE OF THE MEMBRANE LAYER, IS IT POLAR OR NON POLAR?  
6:38:02 PM MsChien: YES

6:38:23 PM MsChien: THE INSIDE OF THE MEMBRANE LAYER, IS IT POLAR OR NON POLAR?  
6:38:26 PM Adam: nonpolar  
6:38:27 PM OMA: non polar  
6:38:29 PM MsChien: GOOOD  
6:38:30 PM MsChien: SO  
6:38:42 PM MsChien: WHY CAN'T NON POLAR MOLECULES INITIALLY HAVE TROUBLE GOING INTO THE CELL?  
6:38:48 PM MsChien: CAN  
6:38:49 PM MsChien: I MEAN  
6:38:56 PM Adam: because the outer layer is polar and attracts them  
6:39:17 PM NICK: wouldnt that make it easier to pass through?  
6:39:27 PM Adam: yrah thats what i thought  
6:39:30 PM MsChien: NON POLAR AND POLAR DOES NOT ATTRACT  
6:39:32 PM Rachel: because water is polar and if it is nonpolar then it refutes water  
6:39:34 PM OMA: because they have to go thru the hydrophilic layer which is polar  
6:39:47 PM MsChien: OMA YES  
6:39:49 PM MsChien: RACHEL YES  
6:39:54 PM MsChien: POLAR AND POLAR ATTRACT  
6:40:01 PM Adam: oh yeah  
6:40:15 PM MsChien: REMEMBER THAT NON POLAR MOLECULES HAVE THE SAME CHARGE THROUGHOUT  
6:40:27 PM MsChien: WHEREAS A POLAR MOLECULE HAS BOTH CHARGES, SO THEY CAN ATTRACT  
6:40:41 PM NICK: i dont understand

6:45:40 PM MsChien: ok wehre were we  
6:46:04 PM Rachel: polar and nonpolar  
6:46:12 PM MsChien: ok did anyone answer nick's question  
6:46:22 PM Rachel: i tried but failed  
6:46:33 PM MsChien: cut and paste your answer  
6:46:34 PM MsChien: let me see  
6:46:55 PM Rachel: water equals polar hydophobic layer equals nonpolar  
6:47:03 PM MsChien: eh  
6:47:04 PM MsChien: ok  
6:47:11 PM MsChien: polar has what types of charges  
6:47:12 PM MsChien: ???????  
6:47:19 PM NICK: i dont comprehend  
6:47:23 PM Adam: positive right?  
6:47:25 PM Rachel: positive  
6:47:27 PM KAREENA: positiv  
6:47:28 PM NICK: neutral?  
6:47:29 PM MsChien: thats it?  
6:47:30 PM MsChien: no  
6:47:36 PM MsChien: it has BOTH positive and negative charges  
6:47:36 PM Adam: which is it?  
6:47:40 PM MsChien: water is polar  
6:47:43 PM Rachel: ok  
6:47:50 PM MsChien: it is NOT a neutral molecule  
6:47:56 PM NICK: oh i see, like water  
6:48:00 PM Adam: so it is positive and neutral  
6:48:00 PM MsChien: yes  
6:48:04 PM MsChien: no  
6:48:07 PM MsChien: it is POLAR  
6:48:18 PM MsChien: it has both charges  
6:48:27 PM MsChien: they dont cancel each other out  
6:48:27 PM Rachel: its positive and negative

6:48:31 PM MsChien: yes rachel  
6:48:36 PM NICK: what does polar mean?  
6:48:40 PM Rachel: k so answer the question  
6:48:41 PM Adam: ok so polar just mean it has a charge no matter the charge  
6:48:44 PM Rachel: WHY CAN'T NON POLAR MOLECULES INITIALLY HAVE TROUBLE GOING INTO THE CELL?  
6:49:04 PM Adam: b ecause they are repelled by the polar outer layer  
6:49:09 PM Rachel: ok  
6:49:13 PM MsChien: adam: polar molecules has BOTH positive and negative charges  
6:49:18 PM MsChien: like the POLES of the each  
6:49:25 PM OMA: water is an example of a polar molecule which the hydrophilic layer of the bilayer attracts but it has trouble getting thru the hydrophobic layer which is nonpolar  
6:49:26 PM MsChien: it has BOTH a north and south pole  
6:49:38 PM MsChien: earth  
6:49:42 PM Rachel: k  
6:49:43 PM NICK: so water has trouble going through?  
6:49:49 PM Rachel: no  
6:49:57 PM MsChien: no remember taht the membrane is fluid  
6:50:07 PM Rachel: it is able to go through  
6:50:15 PM MsChien: so with a concentration gradient it can go through with osmosis  
6:50:18 PM Rachel: because hydrophilic is polar and so is water  
6:50:22 PM MsChien: and passive transport  
6:50:33 PM Rachel: well osmosis  
6:50:38 PM Rachel: right?  
6:50:41 PM MsChien: yes  
6:50:48 PM Rachel: oh you said that already  
6:50:50 PM MsChien: non polar moelcules has only ONE charge  
6:50:51 PM NICK: okay but it will have slight trouble going through the fatty acid center?  
6:51:02 PM OMA: neutral  
6:51:02 PM NICK: correct?  
6:51:03 PM MsChien: slight but really insignificant  
6:51:16 PM NICK: okokok  
6:51:16 PM MsChien: oma: not neutral just one charge  
6:51:20 PM MsChien: either positive  
6:51:23 PM MsChien: or either negative  
6:51:30 PM OMA: ok  
6:51:45 PM MsChien: ok  
6:51:52 PM NICK: so, polar water can go through the polar hydrophilic head layer because they are both polar  
6:51:58 PM Rachel: yes  
6:52:06 PM MsChien: yes  
6:52:14 PM NICK: ok got it  
6:52:21 PM MsChien: WHY do NON POLAR MOLECULES INITIALLY HAVE TROUBLE GOING INTO THE CELL?  
6:52:39 PM NICK: because the outermost layer is polar  
6:52:43 PM MsChien: good  
6:52:49 PM NICK: touchdown  
6:52:52 PM MsChien: and how DO they get into the cell?  
6:52:54 PM Rachel: because the outer layer is polar and refute the non polar molecule  
6:52:59 PM MsChien: rachel - si  
6:53:00 PM NICK: pumps  
6:53:06 PM Adam: through active transport?  
6:53:07 PM MsChien: shoes are not allowed  
6:53:10 PM Rachel: yes protein pumps  
6:53:14 PM NICK: and active transport  
6:53:15 PM MsChien: be more specific

6:53:23 PM Rachel: atp and protein pumps  
6:53:28 PM MsChien: achel good  
6:53:30 PM Adam: protien pumps such as the sodium potassium pump  
6:53:35 PM NICK: thats it?  
6:53:36 PM MsChien: for full points you would have to describe the process  
6:53:38 PM MsChien: yes  
6:53:45 PM NICK: what process?  
6:53:56 PM Rachel: could i use an example like the NaK pump  
6:53:57 PM Adam: so all non polar molecule have to be brought through with pumps  
6:54:06 PM OMA: a phosphate breaks off the atp and attaches to the protein pump  
6:54:11 PM Rachel: and get full points  
6:54:15 PM MsChien: nick - what rachel said  
6:54:22 PM MsChien: oma - BAM!  
6:54:34 PM Rachel: and the atp turns into adp  
6:54:42 PM MsChien: BAM!  
6:54:50 PM OMA: allowing the pump to open and close allowing the needed materials in the cell and pushing out the unnecessary materials  
6:54:55 PM Rachel: yes  
6:54:56 PM MsChien: BAM!  
6:55:02 PM NICK: which is then turned back into atp later  
6:55:05 PM Rachel: will we need to know the Na to K ratio  
6:55:10 PM MsChien: YES  
6:55:14 PM Rachel: 3:2  
6:55:16 PM Rachel: right?  
6:55:21 PM MsChien: MORE DETAILS WILL EITHER SOLIDIFY YOUR POINTS OR ADD MORE  
6:55:24 PM NICK: oh yes  
6:55:25 PM MsChien: RACHEL - SI  
6:55:37 PM NICK: si?  
6:55:41 PM MsChien: SI  
6:55:42 PM Rachel: it turns back into atp with the help of food  
6:55:51 PM MsChien: RACHEL - MORE CELLULAR RESPIRATION  
6:55:56 PM NICK: what is si?  
6:55:59 PM Rachel: yes  
6:56:00 PM Adam: wait, there is more K on the inside of the cell right?  
6:56:02 PM MsChien: SI - YES IN SPANISH  
6:56:04 PM Rachel: in spanish  
6:56:07 PM MsChien: ADAM SI  
6:56:10 PM Adam: ok  
6:56:24 PM Rachel: there is more Na on the ouside of the cell  
6:56:31 PM MsChien: YES  
6:56:31 PM Rachel: and more K on the inside of the cell  
6:56:32 PM NICK: we are speking english  
6:56:35 PM MsChien: YES  
6:56:36 PM Rachel: the ration is 3:2  
6:56:43 PM MsChien: YES  
6:56:44 PM Adam: 3 what to 2 what?  
6:56:48 PM MsChien: NA:K  
6:56:50 PM Rachel: 3 Na to 2 K  
6:56:56 PM NICK: what does spanish have to do with this?  
6:56:57 PM MsChien: GOOD RACHEL  
6:56:58 PM KAREENA: 3 na to 2k  
6:57:04 PM MsChien: NOTHING  
6:57:09 PM MsChien: ITS ANOTHER WAY TO SAY YES  
6:57:13 PM Rachel: she was switching things up  
6:57:18 PM NICK: oh okay



7:03:12 PM MsChien: OK GUYS ITS SENIOR TIME  
7:03:23 PM Rachel: thats all we need to know  
7:03:25 PM MsChien: SEE YOU GUYS LATER  
7:03:25 PM Adam: ok  
7:03:25 PM Rachel: ??  
7:03:32 PM NICK: what does cholesterol do in the membrane?  
7:03:33 PM OMA: bye ms. chien!!  
7:03:38 PM Rachel: later  
7:03:40 PM Adam: adios!  
7:03:42 PM MsChien: YES, AND EVERYTHING IN THE PACKET, ASSESSMENT STATEMENT  
AND THROUGHOUT THE GAME  
7:03:48 PM Rachel: k