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Cell Biology: Membrane Structure & Transport

Printable Flashcards — Pre-Med Biology

Fluid mosaic model, membrane fluidity, receptors, channels, and transport mechanisms. Active vs passive transport.

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120 cards — Printable Flashcards

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1

Cell membrane: what's it mostly made of?

2

Phospholipid: what makes it perfect for membranes?

3

Phospholipids are **amphipathic**:
hydrophilic heads and
hydrophobic tails.

4

Why do phospholipids form a bilayer in water (not a single layer)?

5

Fluid mosaic model: what does it mean?

6

What kind of movement do membrane lipids do most easily?

7

Integral (transmembrane) vs peripheral proteins: what's the difference?

8

If a protein crosses the membrane, what kind of amino acids will it have in the middle part?



2

It's amphipathic: hydrophilic head + hydrophobic tails.

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1

A phospholipid bilayer with proteins embedded in it.

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4

Because hydrophobic tails hide from water on both sides, so tails face inward and heads face water.

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3

Phospholipids are amphipathic: hydrophilic heads and hydrophobic tails.

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6

Lateral movement (sideways) within the same layer.

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5

The membrane is fluid (lipids/proteins can move sideways) and it's a mosaic of different components.

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8

Hydrophobic amino acids.

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7

Integral proteins sit in the bilayer; peripheral proteins stick to the surface.

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9

Are proteins floating randomly everywhere in the membrane all the time?

10

Membrane carbohydrates: where do they usually face?

11

Glycoprotein vs glycolipid: what's the difference?

12

Membrane is selectively permeable. Translate that.

13

Membrane fluidity: why do we care?

14

Saturated fatty acid tails make membranes... more fluid or more rigid?

15

Unsaturated fatty acid tails make membranes... more fluid or more rigid?

16

More `{{c1::unsaturated}}` tails -
> more membrane `{{c2::fluidity}}`.



10

Outside the cell (extracellular side).

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9

Not always. Some are anchored to the cytoskeleton or extracellular matrix, so they stay put.

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12

It lets some things pass easily and blocks others.

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11

Glycoprotein = protein with carbs attached.
Glycolipid = lipid with carbs attached.

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14

More rigid (less fluid).

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13

Because proteins need movement and membranes must bend/fuse for transport and cell function.

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16

More unsaturated tails -> more membrane fluidity.

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15

More fluid.

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17

Temperature effect: higher temp makes membranes...

18

Temperature effect: lower temp makes membranes...

19

Chain length: longer fatty acid tails make membranes...

20

Chain length: shorter fatty acid tails make membranes...

21

Cholesterol: does it ALWAYS increase membrane fluidity?

22

At high temperature, cholesterol makes the membrane...

23

At low temperature, cholesterol makes the membrane...

24

Quick fluidity checklist: name 3 things that increase fluidity.



18

Less fluid (more rigid).

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17

More fluid.

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20

More fluid.

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19

Less fluid (more rigid).

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22

Less fluid (more stable).

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21

No. It buffers fluidity: prevents too much fluidity at high temp and prevents solidifying at low temp.

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24

Higher temperature, more unsaturated tails, shorter tails (and cholesterol at low temps).

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23

More fluid (prevents tight packing).

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25

Quick fluidity checklist: name
3 things that decrease fluidity.

26

If a cell is in a cold environment, what
membrane change helps keep it functional?

27

If you see 'unsaturated = more rigid'
in an option, what should you do?

28

What crosses the lipid bilayer
easiest (no proteins needed)?

29

Do ions (Na^+ , K^+ , Cl^-) cross the
membrane easily by themselves?

30

Water crosses the membrane how (main idea)?

31

Aquaporins are...

32

Diffusion: what's the direction rule?



26

Increase unsaturated fatty acids
(more kinks) to keep membrane fluid.

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25

Lower temperature, more saturated tails,
longer tails (and cholesterol at high temps).

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28

Small nonpolar molecules (like O₂, CO₂).

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27

Reject it. Unsaturated tails increase fluidity.

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30

Slowly through the bilayer,
faster through aquaporins.

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29

No. They need channels/transporters.

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32

From high concentration to low
concentration (down the gradient).

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31

Water channels.

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33

Osmosis: what's moving, and in what direction?

34

Hypertonic solution does what to an animal cell?

35

Hypotonic solution does what to an animal cell?

36

Isotonic solution does what to an animal cell?

37

Plant cell in hypotonic solution: what happens?

38

If a question says 'cell wall prevents bursting', it's talking about...

39

Permeability ranking (rough): which crosses easier, O₂ or glucose?

40

Why does membrane fluidity affect permeability?



34

Water leaves the cell -> it shrinks.

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33

Water moves toward the higher solute concentration (lower water concentration).

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36

No net water movement -> cell stays the same size.

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35

Water enters -> it swells (can lyse).

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38

Plant cells (and many prokaryotes), not animal cells.

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37

It becomes turgid (firm), not burst.

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40

More fluid membranes are generally more permeable (things slip through more).

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39

O₂ crosses easier.

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41

Facilitated diffusion: active or passive?

42

Active transport: what makes it 'active'?

43

Channel vs carrier: which one is usually faster?

44

Channel proteins allow what kind of transport?

45

Carrier proteins can do facilitated diffusion
OR active transport: true or false?

46

Why do carriers 'saturate' at
high solute concentration?

47

Simple diffusion vs facilitated diffusion:
what's the easiest distinction?

48

If a transport process uses ATP
directly, it's most likely a...



42

It moves substances against their gradient (needs energy).

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41

Passive (still down the gradient).

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44

Facilitated diffusion (down gradient).

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43

Channels are usually faster.

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46

Because there are limited carriers, and each takes time to flip shape.

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45

True.

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48

Pump (primary active transport).

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47

Facilitated diffusion uses a membrane protein; simple diffusion does not.

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49

Sodium-potassium pump (Na^+/K^+ pump): what's the big idea?

50

Secondary active transport: what powers it?

51

Symport vs antiport: what's the difference?

52

Facilitated diffusion is `{{c1::passive}}` transport down a gradient, but it uses a `{{c2::protein}}`.

53

Ion channels are selective.
What determines selectivity?

54

Gated channel means...

55

Ligand-gated channel: what opens it?

56

Voltage-gated channel: what opens it?



50

Energy stored in an ion gradient (like Na^+ gradient).

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49

Uses ATP to pump Na^+ out and K^+ in, creating gradients.

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52

Facilitated diffusion is passive transport down a gradient, but it uses a protein.

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51

Symport moves two things the same direction. Antiport moves them opposite directions.

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54

It opens/closes in response to a signal (voltage, ligand, stretch).

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53

The size/charge properties of the channel pore and its amino acids.

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56

A change in membrane voltage (membrane potential).

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55

A chemical (ligand) binding to it.

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57

Mechanically gated channel: what opens it?

58

If a stem says 'protein creates a hydrophilic tunnel across the membrane', that's a...

59

If a stem says 'protein binds glucose then flips shape to release it', that's a...

60

Why do cells bother making ion gradients in the first place?

61

Receptor: what is it in one line?

62

Why can one hormone affect one cell type but not another, even in the same blood?

63

Membrane receptor vs channel: what's the difference?

64

What usually happens to a receptor when a ligand binds?



58

Channel.

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57

Physical stretch/pressure.

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60

Gradients power transport,
signaling, and electrical activity.

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59

Carrier (transporter).

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62

Only cells with the right receptor respond.

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61

A protein that binds a specific signal
molecule and triggers a response.

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64

It changes shape (conformational change)
and starts a signal inside the cell.

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63

Receptor = detects signal. Channel
= lets stuff pass. Some proteins
do both (ligand-gated channels).

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65

Cell signaling word check: what's a ligand?

66

Why are membrane receptors needed for many hormones?

67

Steroid hormones (like cortisol) usually need membrane receptors: true or false?

68

Peptide hormones usually bind where?

69

Signal transduction: what's the idea?

70

Why do signaling pathways often have multiple steps?

71

Receptor-mediated endocytosis: what's it used for?

72

Receptor downregulation (desensitization): what happens if a cell is flooded with signal for too long?



66

Because many signaling molecules are too large/polar to cross the lipid bilayer.

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65

A molecule that binds to a receptor.

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68

Cell surface (membrane) receptors.

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67

False. Steroids are lipid-soluble and can cross membranes, so they often use intracellular receptors.

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70

Amplification: one ligand can trigger many internal molecules -> big response.

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69

Turning an outside signal into an inside response through a chain of steps.

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72

Cells can reduce receptor number or responsiveness to avoid overreaction.

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71

To bring specific molecules into the cell by binding them to receptors and forming vesicles.

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73

Trap check: 'membrane is a rigid barrier' - true or false?

74

Trap check: 'facilitated diffusion uses ATP' - true or false?

75

Trap check: 'channels bind the solute and flip shape each time' - true or false?

76

Trap check: 'ions diffuse straight through the lipid bilayer' - true or false?

77

Clue check: 'cell bursts in pure water' - what kind of cell is it?

78

Clue check: 'cell becomes turgid in water' - what kind of cell is it?

79

Clue check: 'detergent destroys virus envelope' - what membrane concept is that testing?

80

Mini boss: You increase saturated fats in the membrane. What happens to fluidity?



74

False.

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73

False.

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76

False.

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75

False. That's carriers.

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78

A plant cell.

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77

An animal cell (no cell wall).

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80

It decreases (membrane becomes more rigid).

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79

Envelopes are lipid membranes,
so detergents disrupt them.

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81

Mini boss: A cell needs to keep membranes fluid in cold. Which lipid change helps most?

82

Mini boss: A drug blocks Na^+/K^+ pump. What happens to ion gradients over time?

83

Mini boss: A transporter moves glucose into a cell down its gradient. Active or passive?

84

Mini boss: A transporter uses Na^+ moving in to pull glucose in against its gradient. What is that?

85

If you picked 'cholesterol always increases fluidity', what's the fix?

86

Membrane proteins do what 4 big jobs?

87

Why are membranes described as 'asymmetric'?

88

If a protein is said to be 'transmembrane', what does that guarantee?



82

They slowly collapse.

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81

More unsaturated tails.

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84

Secondary active transport (co-transport/symport).

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83

Passive (facilitated diffusion).

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86

Transport, receptors/signaling, enzymes,
and cell recognition/attachment.

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85

Cholesterol buffers fluidity: increases
it in cold, decreases it in heat.

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88

It spans the lipid bilayer.

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87

The inside and outside leaflets have different
lipids/proteins, and carbs face outward.

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89

Why can't large polar molecules just 'diffuse through' the membrane?

90

If something crosses the membrane without a protein and without ATP, what kind of transport is it?

91

If something crosses with a protein but still down the gradient, what is it?

92

If something crosses against its gradient, what must be true?

93

Why do cell membranes self-seal after a small tear?

94

Membrane model describing a fluid lipid bilayer with proteins embedded:

95

Short DNA/transport term:
water channels are called:

96

Enzyme/protein that 'seals' the idea of selective binding and response on the membrane:



90

Simple diffusion.

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89

The hydrophobic core blocks them.

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92

Energy is required (active transport).

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91

Facilitated diffusion.

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94

Fluid mosaic model

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93

Hydrophobic tails avoid water, so the bilayer closes to hide tails.

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96

Receptor

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95

Aquaporins

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97

Transport that uses ATP to move a substance against its gradient:

98

A molecule is small, nonpolar, and uncharged. How does it cross the membrane?

99

A molecule is charged (ion). Fastest way across a membrane?

100

A molecule is big and polar (like glucose). How does it usually cross?

101

If a transport rate hits a max even when you increase concentration, that's a clue for...

102

If you picked 'simple diffusion' for glucose moving into a cell, what's the fix?

103

Receptors are specific because...

104

Why is 'one receptor can trigger many responses' possible?



98

Simple diffusion through the lipid bilayer.

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97

Active transport

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100

Using a carrier protein (transporter).

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99

Through an ion channel.

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102

Glucose usually needs a transporter (facilitated diffusion).

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101

Protein-mediated transport (carriers/channels), especially carriers.

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104

Because signaling cascades can branch and amplify.

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103

Their binding site shape/chemistry matches certain ligands.

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105

What's the cleanest difference between a ligand-gated channel and a normal receptor?

106

If a cell stops responding to a hormone even though hormone is high, what's a likely explanation?

107

Saturated tails pack **tightly** -> membrane becomes **less fluid**.

108

Unsaturated tails have **kinks** -> membrane becomes **more fluid**.

109

Cholesterol **buffers** fluidity: prevents membranes being too **fluid** when hot and too **rigid** when cold.

110

Ions need **channels/transporters** because the membrane core is **hydrophobic**.

111

Trap check: 'membrane proteins are just decoration' - what's the reality?

112

Trap check: 'phospholipid tails are hydrophilic' - true or false?



106

Receptor downregulation/desensitization or saturated receptors.

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105

Ligand-gated channel IS a receptor that directly opens a pore when ligand binds.

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108

Unsaturated tails have kinks -> membrane becomes more fluid.

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107

Saturated tails pack tightly -> membrane becomes less fluid.

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110

Ions need channels/transporters because the membrane core is hydrophobic.

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109

Cholesterol buffers fluidity: prevents membranes being too fluid when hot and too rigid when cold.

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112

False. Tails are hydrophobic.

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111

They do most membrane functions (transport, receptors, enzymes, anchors).

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113

Trap check: 'cell membrane = cell wall' - why is that wrong?

114

If a question says 'recognition between cells', which membrane components are the best bet?

115

Blood type antigens (ABO) are found where (basic idea)?

116

Boss fight: A membrane becomes too rigid in winter. Give two fixes a cell could use.

117

Boss fight: You want a drug to cross the membrane without a transporter. What property should it have?

118

Boss fight: A cell responds strongly to a tiny amount of hormone. What concept explains this?

119

Boss fight: An ion channel opens when a neurotransmitter binds. What type of channel is it?

120

Boss fight: A cell takes up LDL/iron specifically via surface proteins and vesicles. What's that called?



114

Carbohydrates on glycoproteins/glycolipids.

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113

Membrane is a lipid bilayer in all cells; wall is a rigid layer outside (plants/bacteria/fungi) and it's not lipid.

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116

Increase unsaturated fatty acids and/or use cholesterol to prevent tight packing.

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115

On membrane carbohydrates (glycoproteins/glycolipids) on red blood cells.

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118

Signal amplification in a signaling cascade.

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117

Small and nonpolar (lipid-soluble).

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120

Receptor-mediated endocytosis.

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119

Ligand-gated ion channel.

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