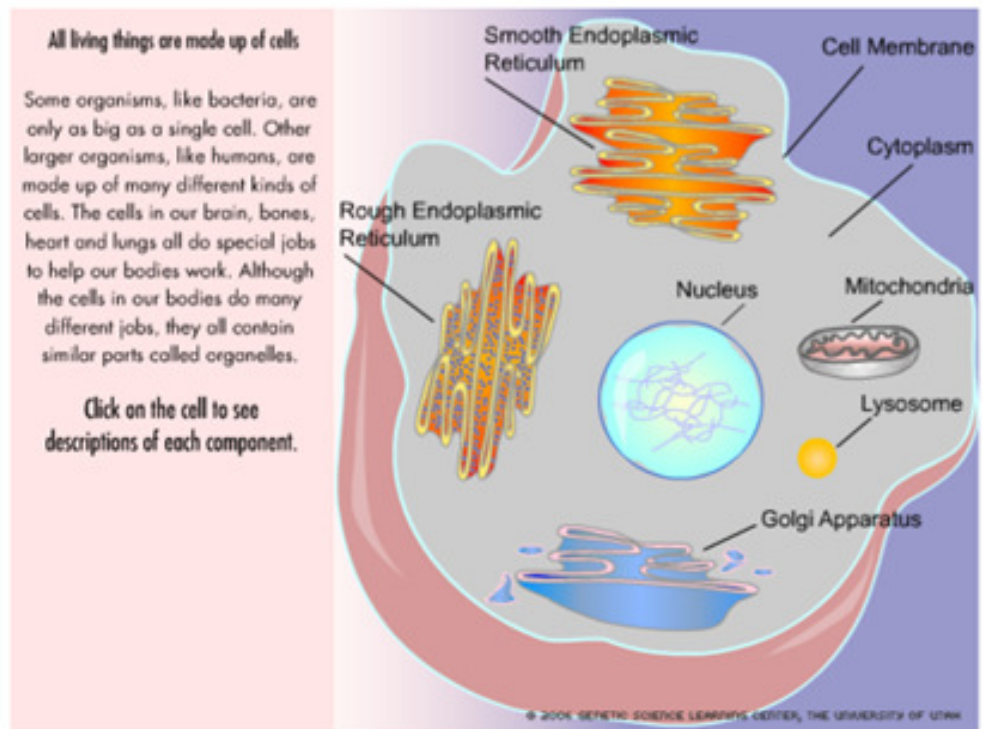


Cell Types

Eukaryotic Cells

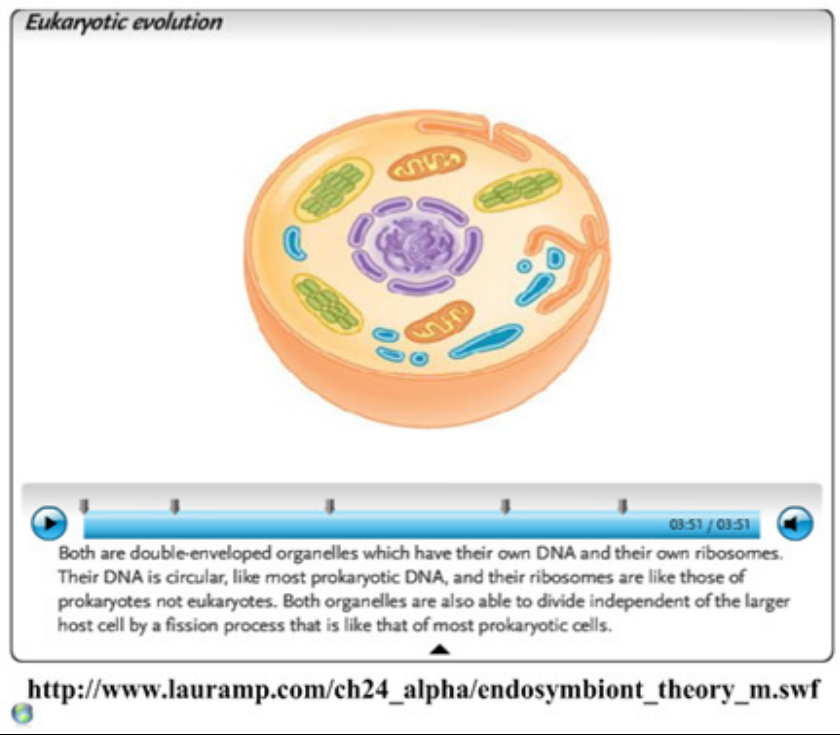
Eukaryotes contain a 'true' nucleus and membrane-bound organelles.
Roll over the organelles to learn more about their functions.
Can you identify them in the line drawing?



<http://learn.genetics.utah.edu/units/basics/cell/>



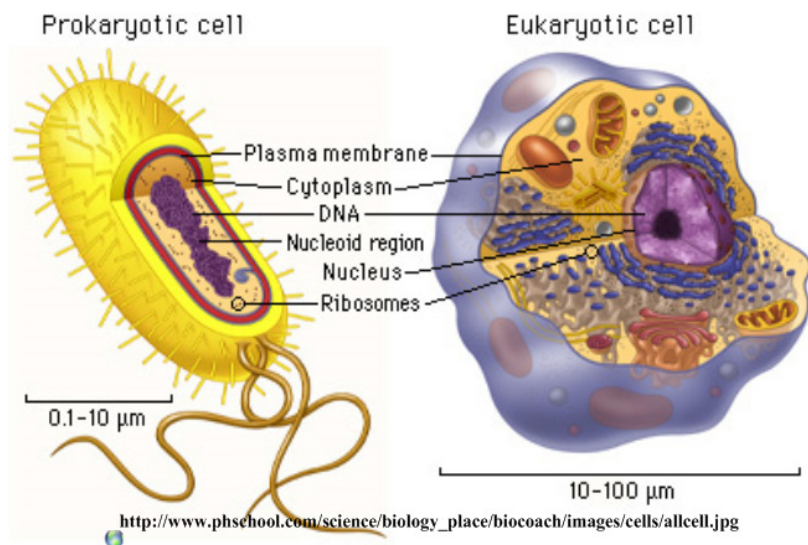
Eukaryotes are more complex and thus later than prokaryotes:



Symbiont theory: smaller unicellular organisms were engulfed and became part of larger organisms, eventually specialising to become organelles within the cell.

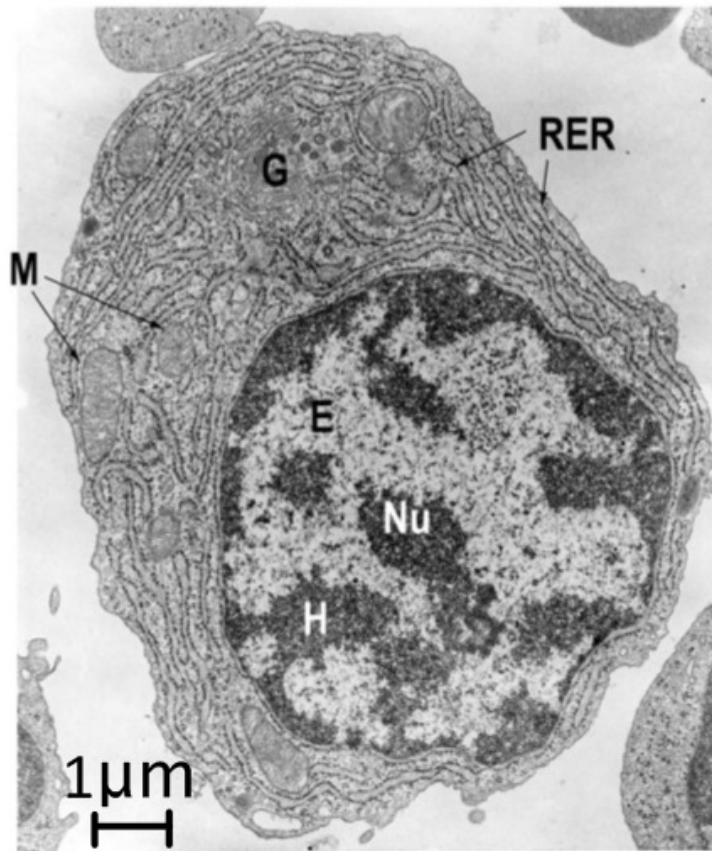
This is a **symbiotic relationship**: the large cell provides a habitat for the smaller prokaryote and in return is rewarded by the products of the prokaryote (e.g. proteins, ATP).

This is supported by the fact that cell organelles are of comparable size to prokaryotes, some organelles (such as mitochondria) have their own DNA and the evidence provided by the fossil record.



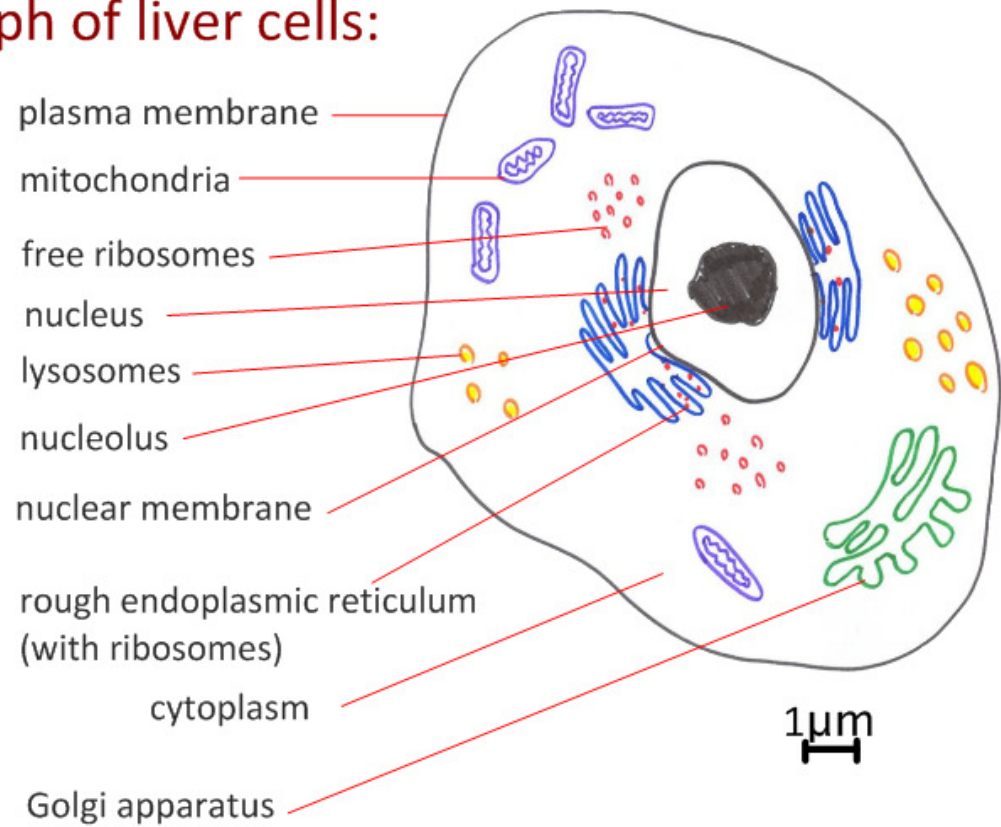
- http://highered.mcgraw-hill.com/sites/9834092339/student_view0/chapter4/animation_endosymbiosis.html

Transmission Electron Micrograph of liver cells:

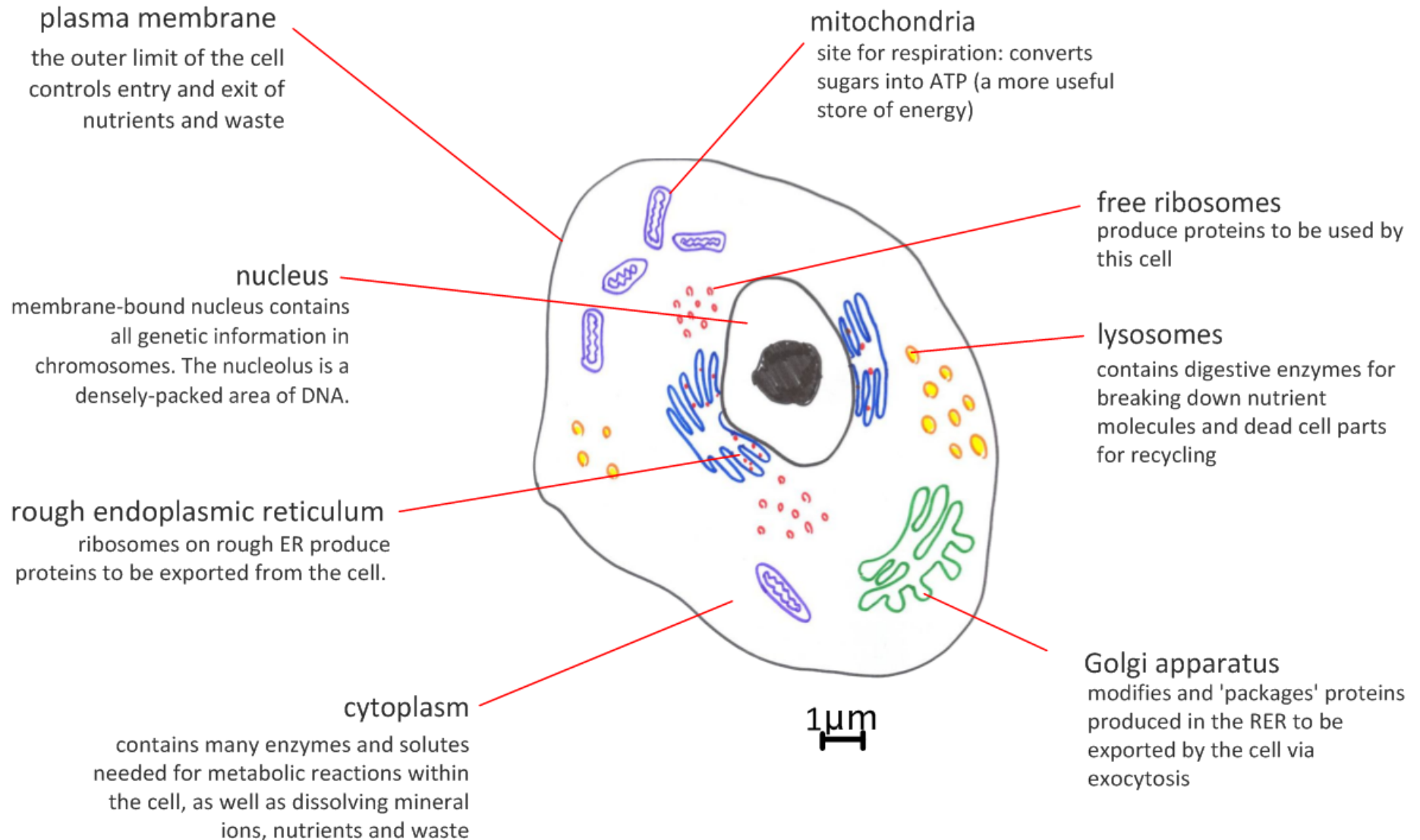


Nu-nucleus, E-euchromatin, H-heterochromatin, M-mitochondria, RER-rough endoplasmic reticulum, G-golgi complex

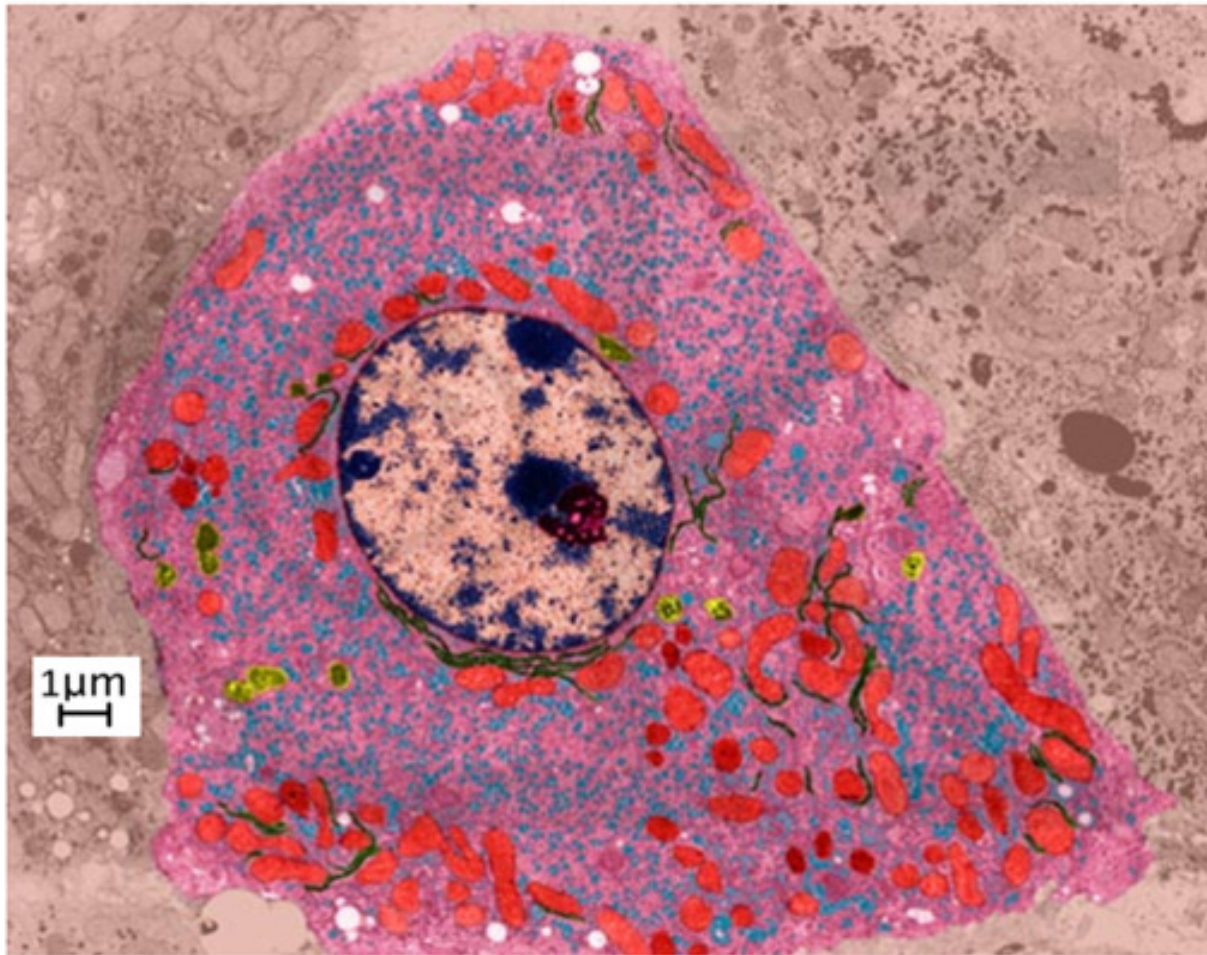
<http://www.uni-mainz.de/FB/Medizin/Anatomic/workshop/EM/externes/Wartenberg/Leber3.jpg>



The functions of eukaryote cell parts:



Which structures can you identify in this false-coloured TEM image?

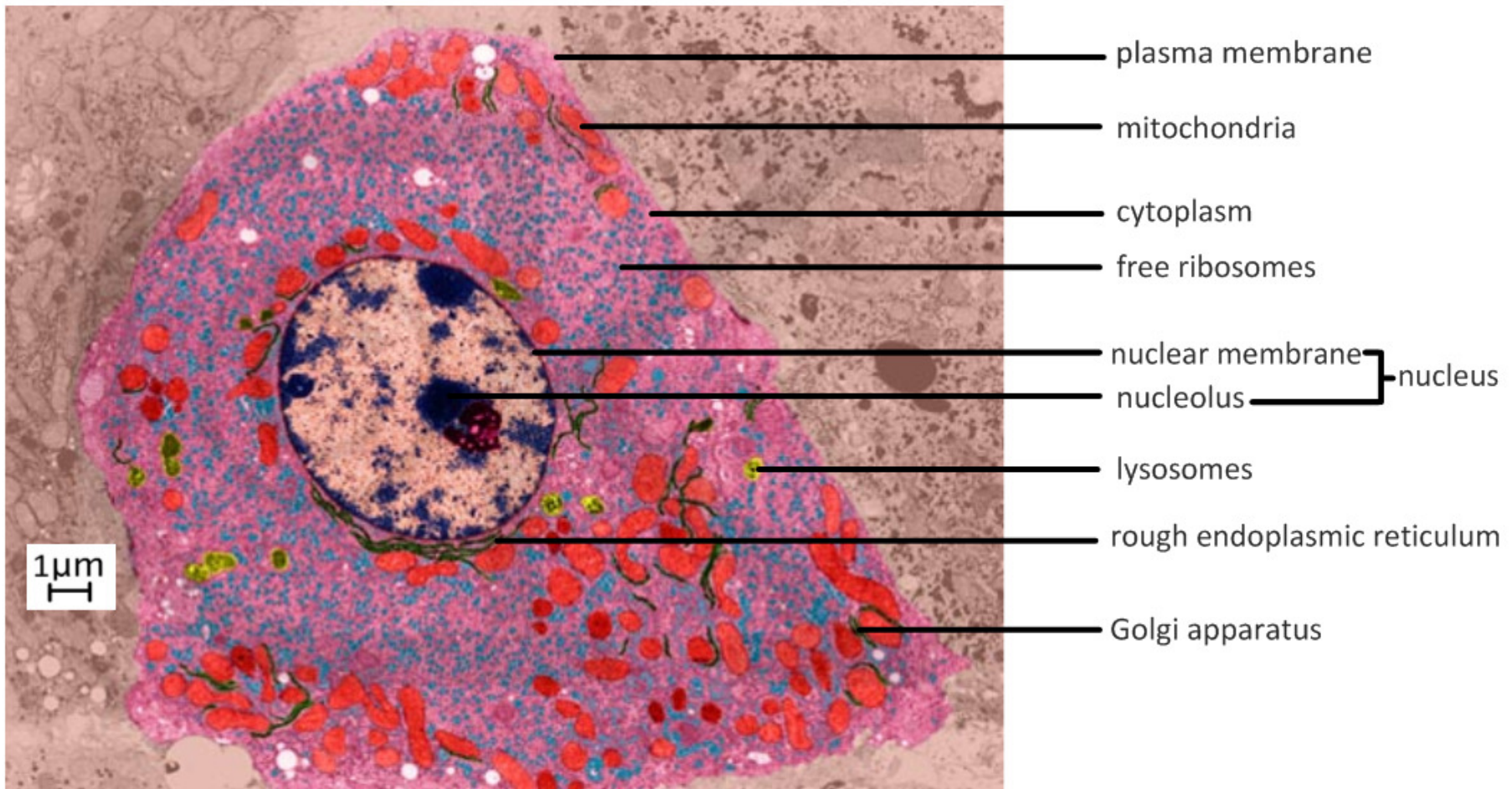


Liver Cell (TEM x9,400)

<http://www.denniskunkel.com/>

<http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookCELL2.html>

Which structures can you identify in this false-coloured TEM image?



Liver Cell (TEM x9,400)


<http://www.denniskunkel.com/>

<http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookCELL2.html>

Comparing prokaryotes and eukaryotes. Complete the table below.

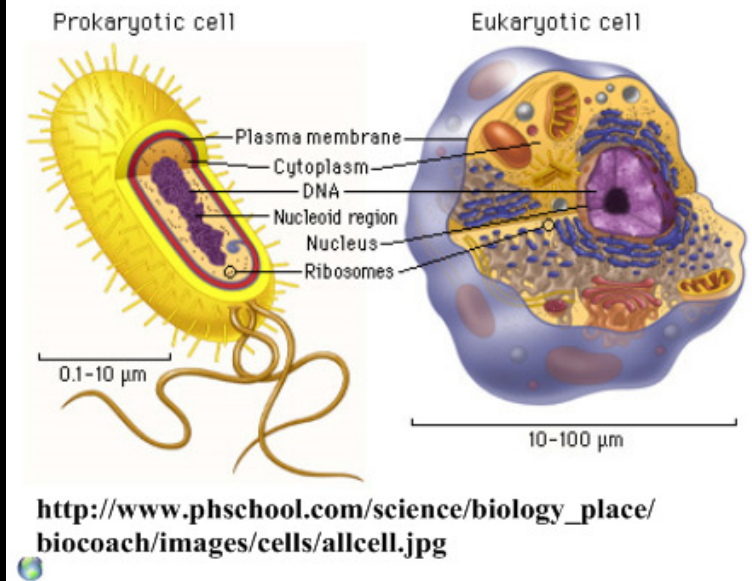
	Size	DNA	Nucleus	Organelles	Ribosomes	Mitochondria
Prokaryotes						
Eukaryotes						

Prokaryote and Eukaryote Cells Compared



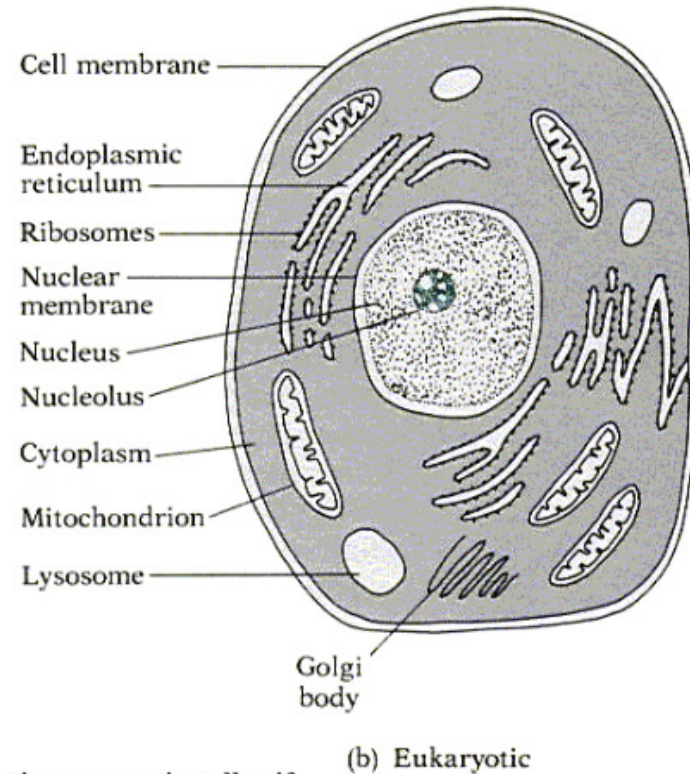
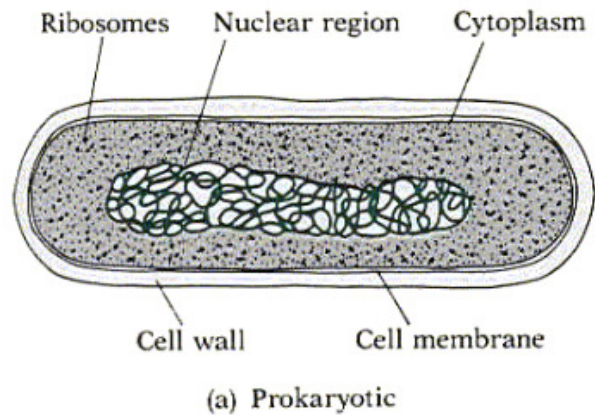
All cells can be classified as prokaryotic or eukaryotic. All plants, animals, fungi, and protists either are single eukaryotic cells or are composed of eukaryotic cells. All prokaryotes are made of single cells.

<http://www.mwit.ac.th/~ooy/e-cell/activity/cell.swf>



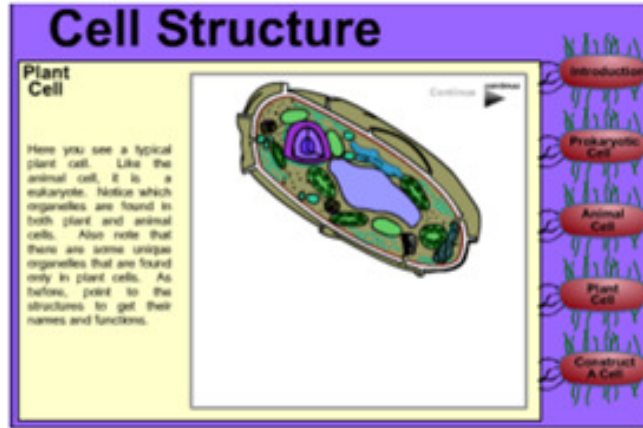
Comparing prokaryotes and eukaryotes. Complete the table below.

	Size	DNA	Nucleus	Organelles	Ribosomes	Mitochondria
Prokaryotes	1 - 3 μ m	closed loop	DNA in cytoplasm	"cell parts"	70S (small)	no
Eukaryotes	10-100 μ m	double helix	has nuclear membrane	membrane bound	80S (big)	yes

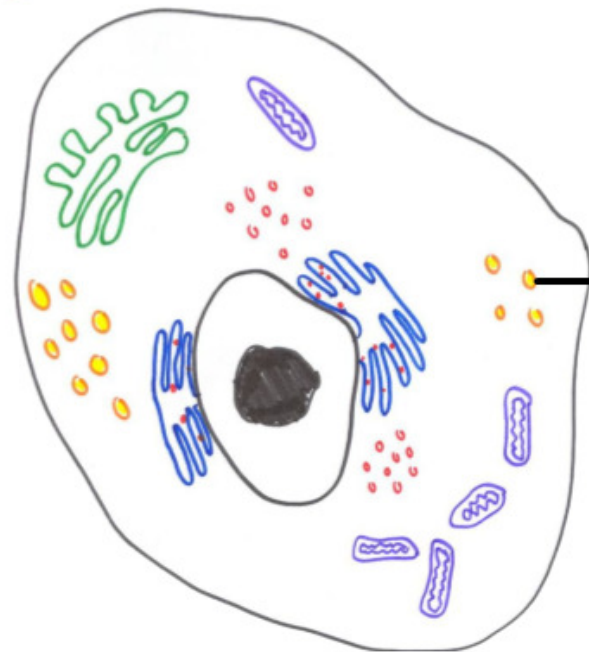


<http://www.ccds.charlotte.nc.us/biology/images/prokaryotic-eucaryotic-cells.gif>

Plant Cells and Animal Cells

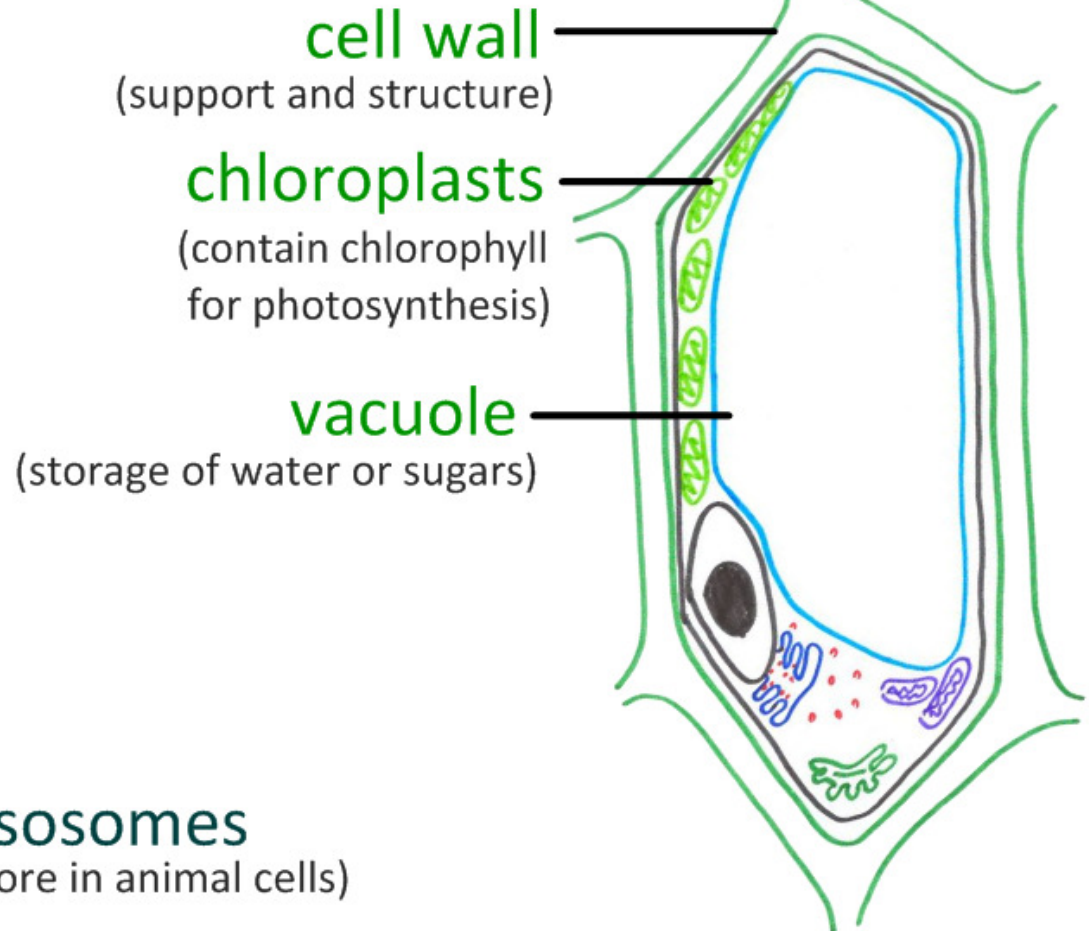


http://www.wiley.com/legacy/college/boyer/0470003790/animations/cell_structure/cell_structure.swf



lysosomes
(more in animal cells)

Note: vacuoles may be present in some animal cells



Transmission Electron Micrographs of plant and animal cells

Animal and plant cells

Mitochondria

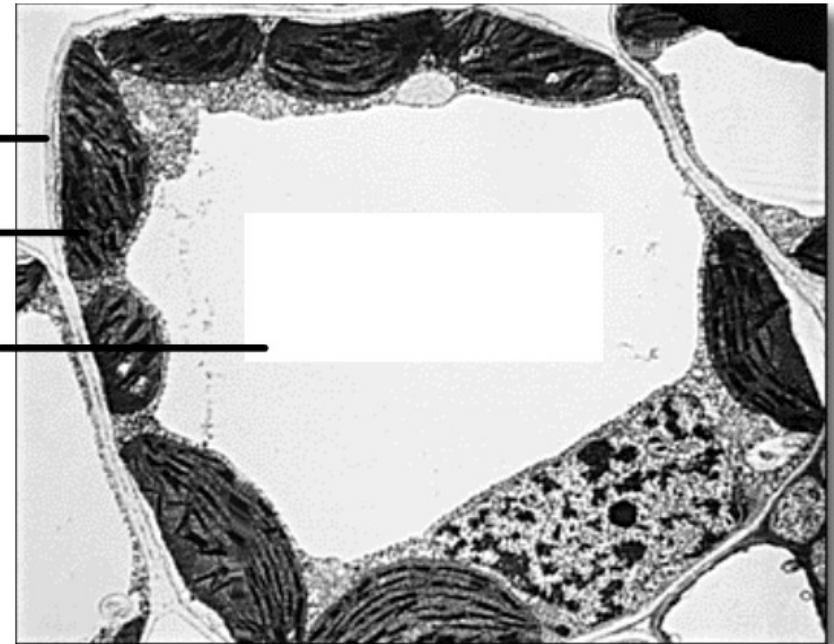
All animal and plant cells contain sub-cellular organelles. Mitochondria are ones which release energy during cellular respiration. The diagram below shows a mitochondrion from an animal cell. Those in plant cells have the same structure but have a slightly different shape.



Index

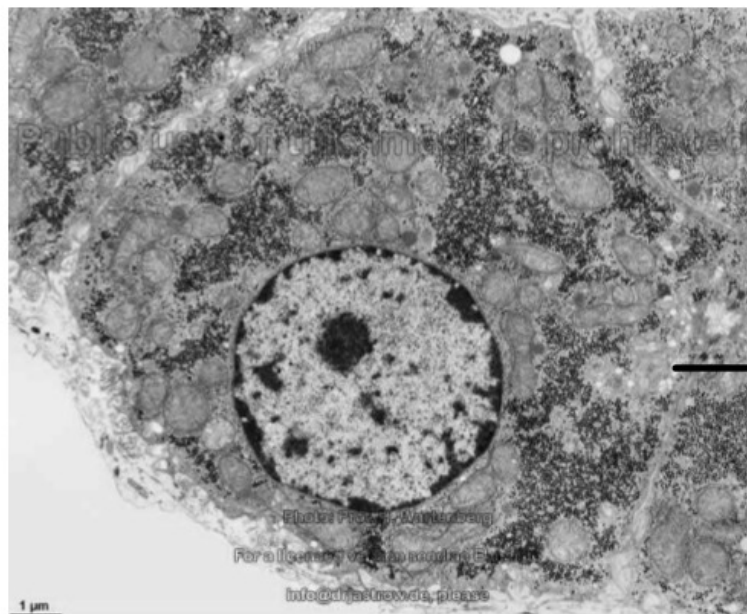
<http://www.purchon.com/biology/flash/cells.swf>

cell wall
chloroplasts
vacuole



Plant cell TEM

http://biology.unm.edu/ccouncil/Biology_124/Summaries/Cell.html



lysosomes

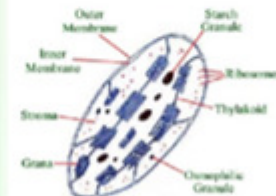
Liver cell TEM

<http://www.uni-mainz.de/FB/Medizin/Anatomie/workshop/EM/externes/Wartenberg/Leber3.jpg>

Animal and plant cells

Chloroplasts

Chloroplasts are found in cells in the green parts of plants; ie in leaves and young shoots, but not in roots. They contain a green chemical called chlorophyll. This converts light energy from the sun into chemical energy in glucose.



Copyright © 2002 Gondar Design

Index

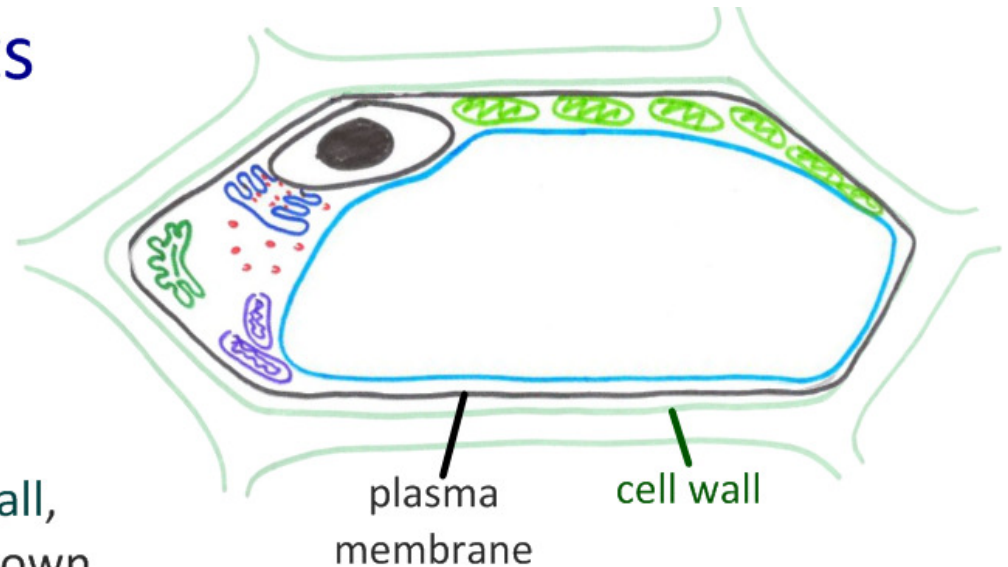
<http://www.purchon.com/biology/flash/cells.swf>

Extracellular Components

outside the cell

The outer limit of the cell is defined as the **plasma membrane** - the barrier between the cell contents and the surrounding environment.

Some cell parts, such as the **plant cell wall**, reach beyond the membrane and are known as **extracellular components**.

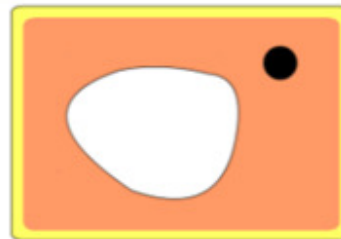


Cell Turgor



Flaccid cell

Low hydrostatic pressure
Wilting plant



Turgid cell

High hydrostatic pressure
Supported plant



<http://www.kscience.co.uk/animations/turgor.swf>

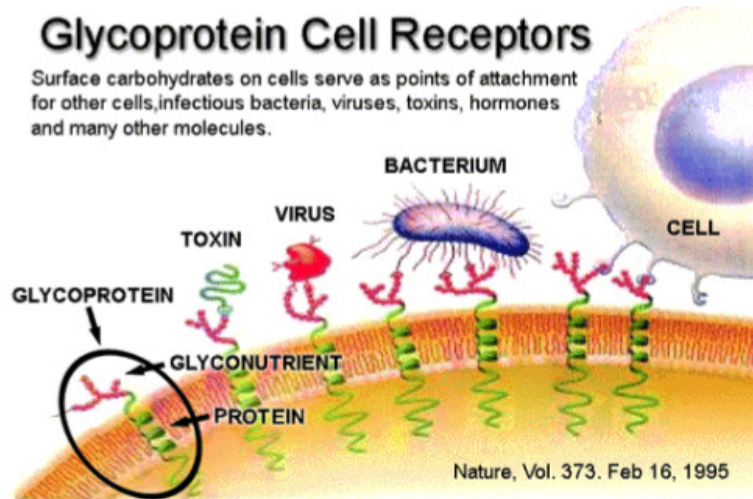
The plant cell wall can withstand high pressure of water within the vacuole, so can support the plant against gravity through cell turgor.

The cell wall also maintains the structure of the cell.

Extracellular components in animal cells:

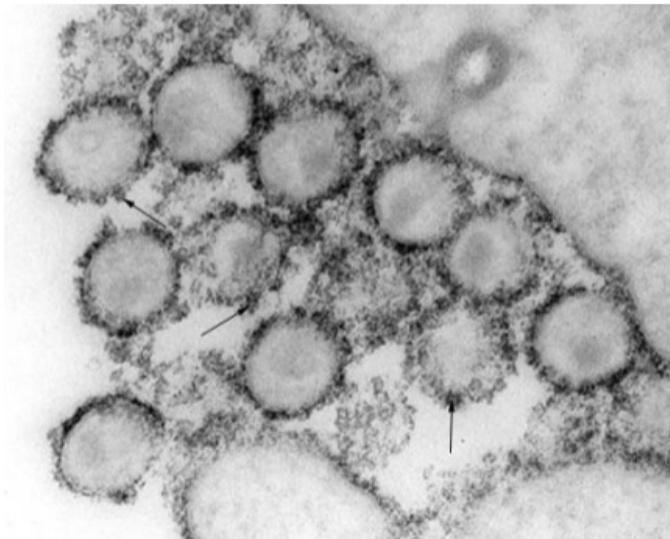
Glycoprotein Cell Receptors

Surface carbohydrates on cells serve as points of attachment for other cells, infectious bacteria, viruses, toxins, hormones and many other molecules.



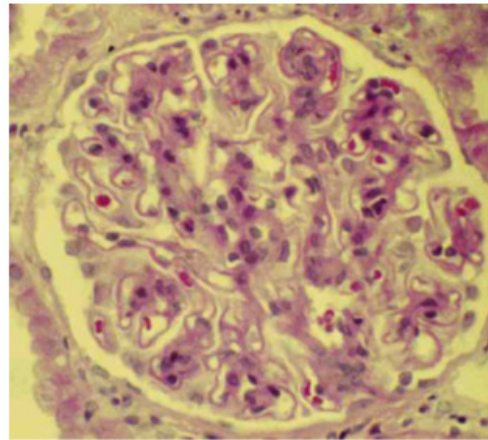
<http://www.glyconutrientsreference.com/Images/cellreceptors.gif>

Glycoproteins aid in cell adhesion, communication, transfer and immunity.



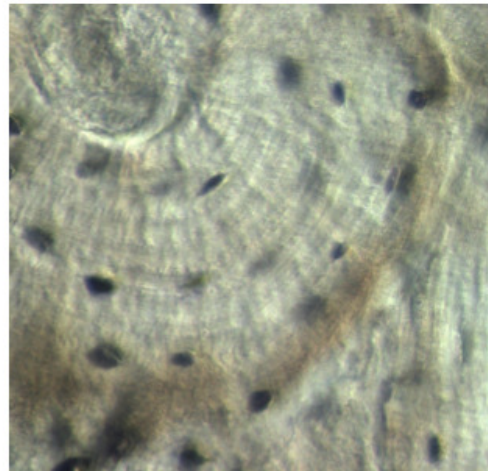
<http://student.ccbcmd.edu/courses/bio141/lecguide/unit1/bgm/u2fig3d.html>

Other examples:



The kidney glomerulus allows ultrafiltration of blood - it is a strong membrane that blood can be pushed through.

<http://www.gamewood.net/rnet/renalpath/tut17.jpg>



The bone matrix is a network of calcium-based compounds that give bone its structure and strength.
Can you see the cells here?

http://facstaff.bloomu.edu/jhranitz/Courses/APHNT/Lab_Pictures/compact_bone.jpg

Three-Dimensional Endoplasmic Reticulum

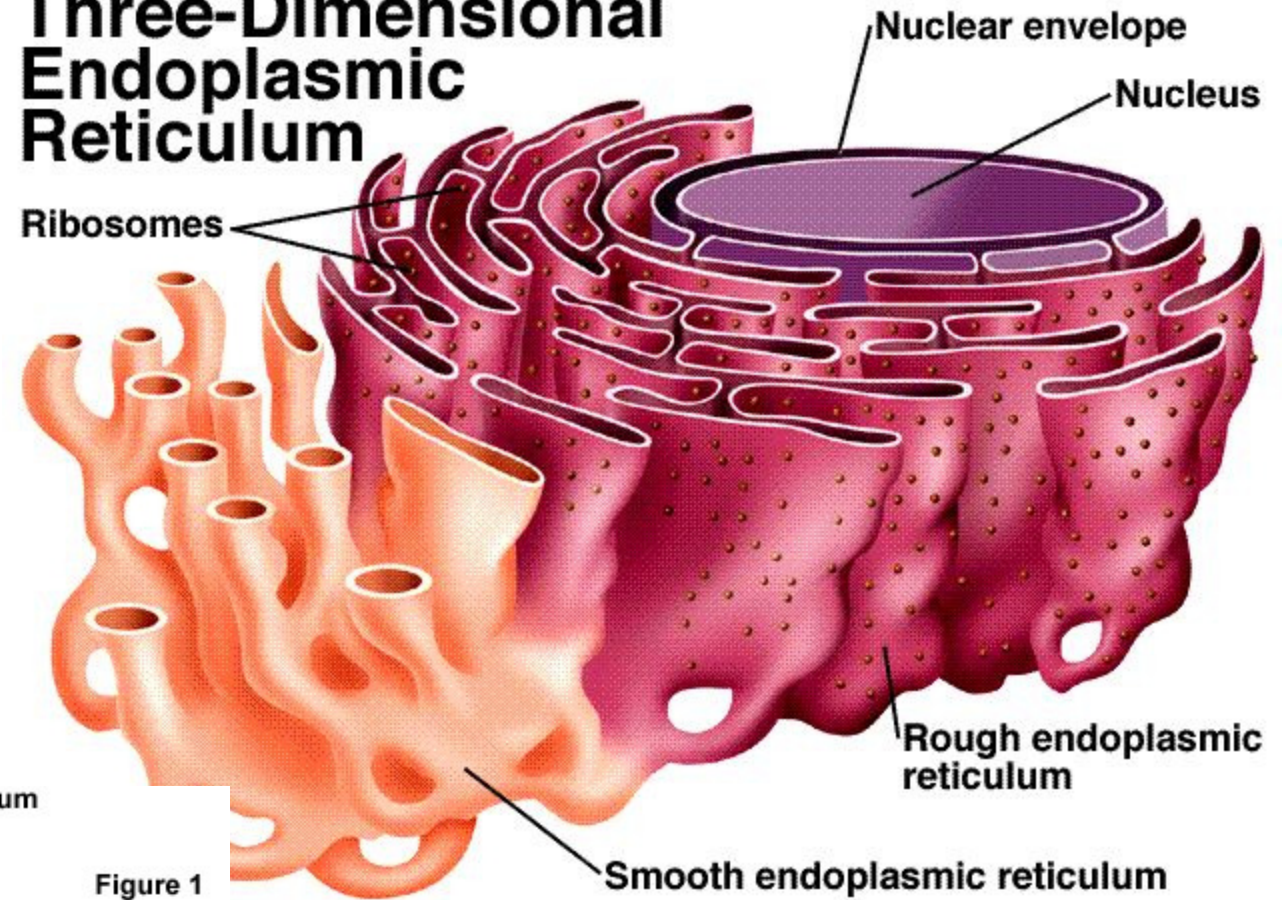
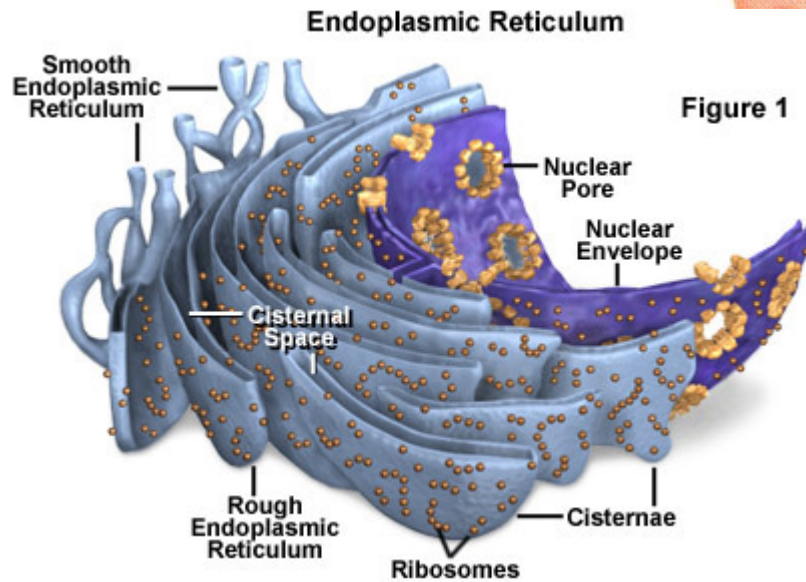
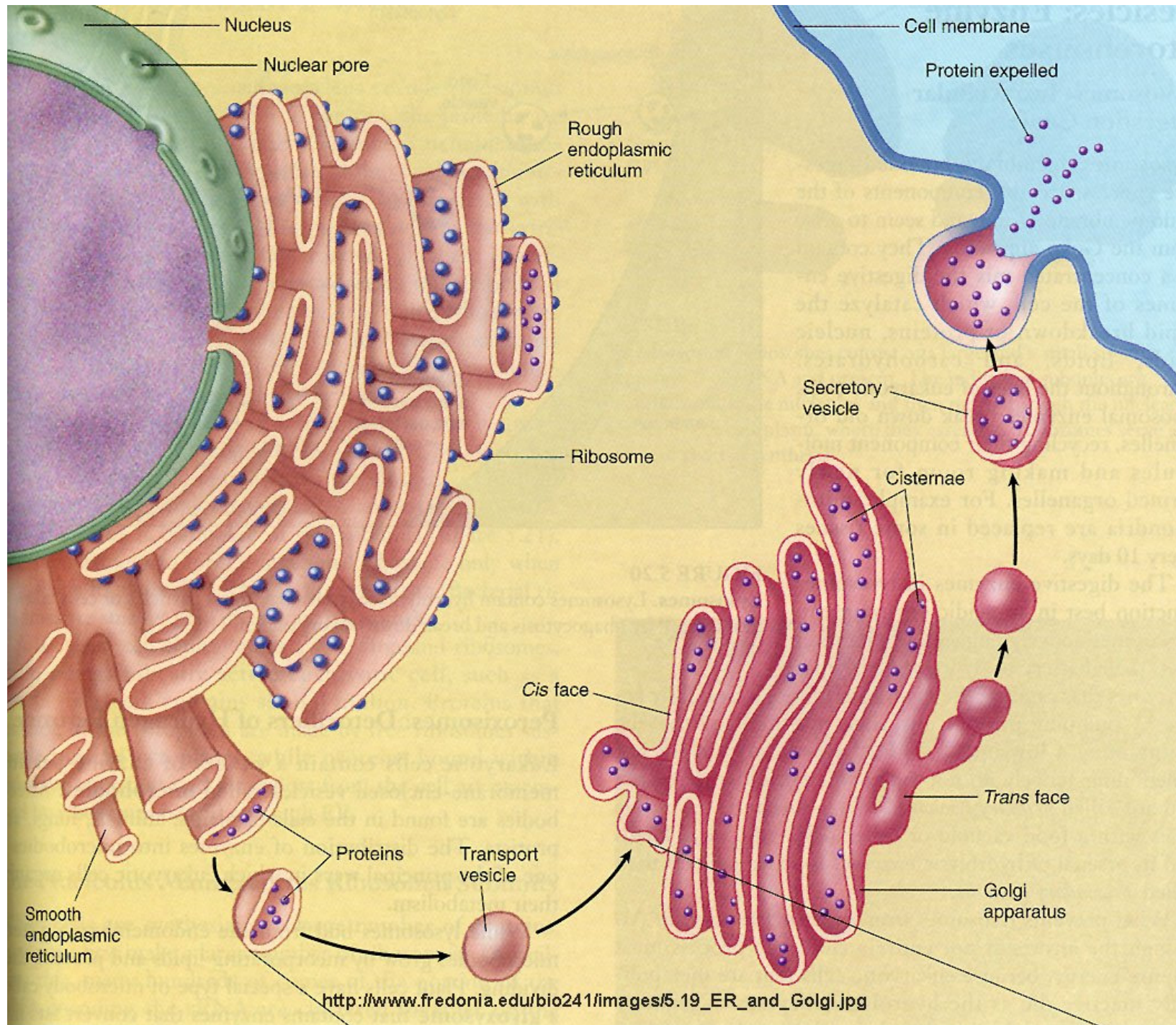
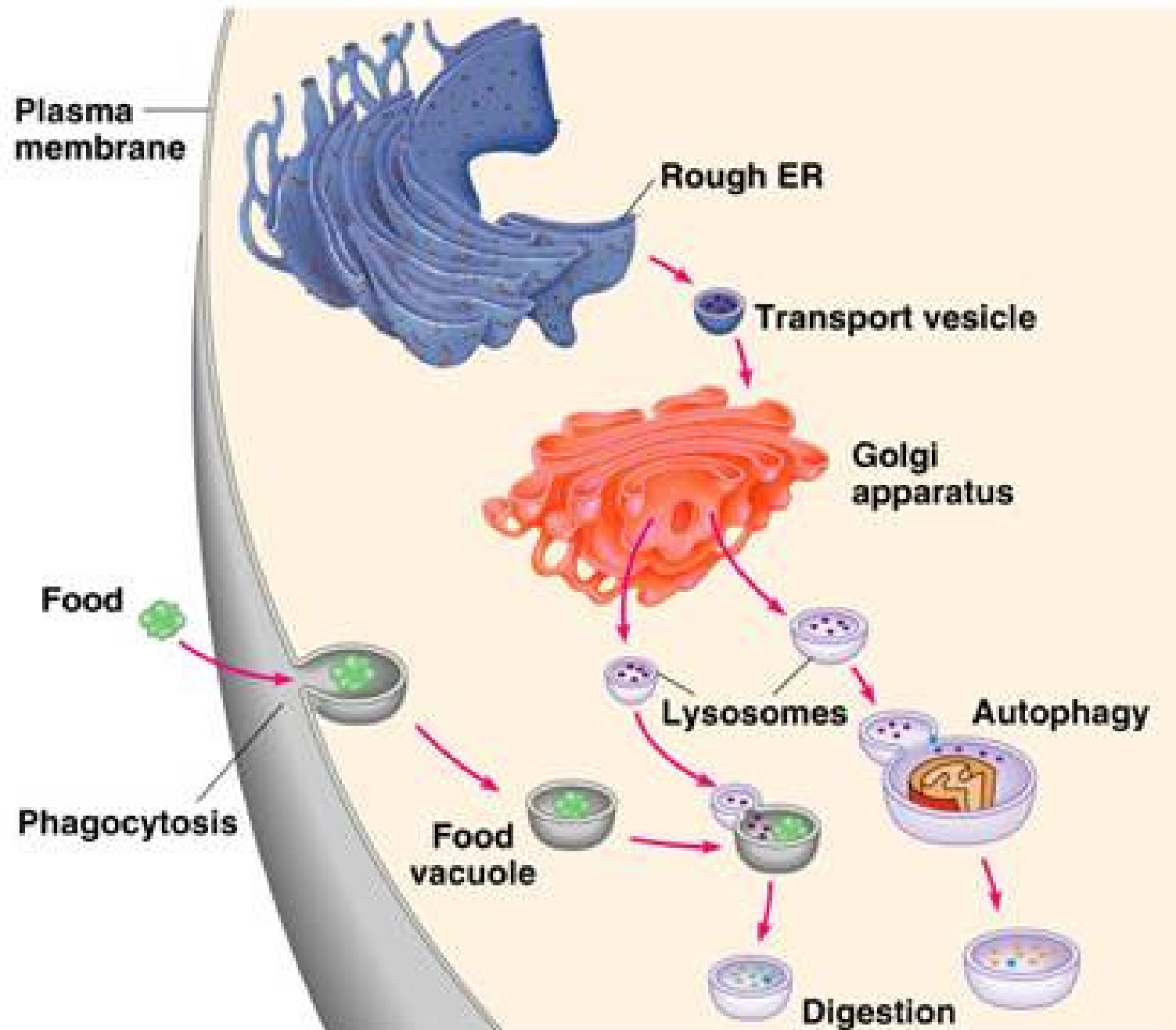


Figure 1







Protein Secretion Animation

- Basic:
<http://www.youtube.com/watch?v=SGBiy1HIWH8>
- With Microscopy:
http://www.youtube.com/watch?NR=1&v=HpQLDBaHD_k
- Utah Genetics:
<http://learn.genetics.utah.edu/content/begin/cells/insideacell/>

Cell differentiation

- In developmental biology, **cellular differentiation** is the process by which a less specialized cell becomes a more specialized cell type.
- Differentiation occurs numerous times during the development of a multicellular organism as the organism changes from a simple zygote to a complex system of tissues and cell types.
- Differentiation happens adults as well: adult stem cells divide and create fully differentiated daughter cells during tissue repair and during normal cell turnover.

Cell Differentiation Cont'd

- Differentiation dramatically changes a cell's size, shape, membrane potential, metabolic activity, and responsiveness to signals.
- These changes are largely due to highly controlled modifications in gene expression.
- With a few exceptions, cellular differentiation almost never involves a change in the DNA sequence itself. Thus, different cells can have very different physical characteristics despite having the same genome.
- <http://www.youtube.com/watch?v=IxFwenTA-gQ>

CELL TYPES AND TISSUES

STIMONETI SUPTUS TEM-ET NIVIT ADIPITUS SANCHE MARGA FACILLI
PITIS NULLA FACILLI DEL-ELUS ULLA RELICIT DOLESPO-ELI REL-ENOCUM
ODOLORITE TE NIH-ELIS ET AD ESSENIH ENERIS EUS ET EA ATUM VER
SUM INURE DO CORRE CORRET INMACENAM DO-ELISAT. UT VENT LUM

TABLE TYPES

[illegible]

CONCISE SUMMARY
 This study of 100 patients with severe, chronic, intractable pain found that 60% of patients achieved significant pain relief with the use of a single intrathecal injection of morphine. The study also found that the use of intrathecal morphine was associated with a significant reduction in the use of oral analgesics and a significant improvement in the quality of life of the patients.

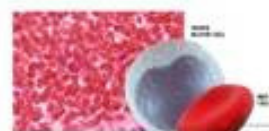


Working Collaborative: Focus
group work with Thelma van

© 2000 Blackwell Science Ltd, *Journal of Internal Medicine* 247: 395–402



THAKOOTH-ARABIC TITLE
 1990-1991, 1992-1993, 1994-1995, 1996-1997, 1998-1999, 2000-2001, 2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015, 2016-2017, 2018-2019, 2020-2021, 2022-2023, 2024-2025, 2026-2027, 2028-2029, 2030-2031, 2032-2033, 2034-2035, 2036-2037, 2038-2039, 2040-2041, 2042-2043, 2044-2045, 2046-2047, 2048-2049, 2050-2051, 2052-2053, 2054-2055, 2056-2057, 2058-2059, 2060-2061, 2062-2063, 2064-2065, 2066-2067, 2068-2069, 2070-2071, 2072-2073, 2074-2075, 2076-2077, 2078-2079, 2080-2081, 2082-2083, 2084-2085, 2086-2087, 2088-2089, 2090-2091, 2092-2093, 2094-2095, 2096-2097, 2098-2099, 2100-2101, 2102-2103, 2104-2105, 2106-2107, 2108-2109, 2110-2111, 2112-2113, 2114-2115, 2116-2117, 2118-2119, 2120-2121, 2122-2123, 2124-2125, 2126-2127, 2128-2129, 2130-2131, 2132-2133, 2134-2135, 2136-2137, 2138-2139, 2140-2141, 2142-2143, 2144-2145, 2146-2147, 2148-2149, 2150-2151, 2152-2153, 2154-2155, 2156-2157, 2158-2159, 2160-2161, 2162-2163, 2164-2165, 2166-2167, 2168-2169, 2170-2171, 2172-2173, 2174-2175, 2176-2177, 2178-2179, 2180-2181, 2182-2183, 2184-2185, 2186-2187, 2188-2189, 2190-2191, 2192-2193, 2194-2195, 2196-2197, 2198-2199, 2200-2201, 2202-2203, 2204-2205, 2206-2207, 2208-2209, 2210-2211, 2212-2213, 2214-2215, 2216-2217, 2218-2219, 2220-2221, 2222-2223, 2224-2225, 2226-2227, 2228-2229, 2230-2231, 2232-2233, 2234-2235, 2236-2237, 2238-2239, 2240-2241, 2242-2243, 2244-2245, 2246-2247, 2248-2249, 2250-2251, 2252-2253, 2254-2255, 2256-2257, 2258-2259, 2260-2261, 2262-2263, 2264-2265, 2266-2267, 2268-2269, 2270-2271, 2272-2273, 2274-2275, 2276-2277, 2278-2279, 2280-2281, 2282-2283, 2284-2285, 2286-2287, 2288-2289, 2290-2291, 2292-2293, 2294-2295, 2296-2297, 2298-2299, 2300-2301, 2302-2303, 2304-2305, 2306-2307, 2308-2309, 2310-2311, 2312-2313, 2314-2315, 2316-2317, 2318-2319, 2320-2321, 2322-2323, 2324-2325, 2326-2327, 2328-2329, 2330-2331, 2332-2333, 2334-2335, 2336-2337, 2338-2339, 2340-2341, 2342-2343, 2344-2345, 2346-2347, 2348-2349, 2350-2351, 2352-2353, 2354-2355, 2356-2357, 2358-2359, 2360-2361, 2362-2363, 2364-2365, 2366-2367, 2368-2369, 2370-2371, 2372-2373, 2374-2375, 2376-2377, 2378-2379, 2380-2381, 2382-2383, 2384-2385, 2386-2387, 2388-2389, 2390-2391, 2392-2393, 2394-2395, 2396-2397, 2398-2399, 2400-2401, 2402-2403, 2404-2405, 2406-2407, 2408-2409, 2410-2411, 2412-2413, 2414-2415, 2416-2417, 2418-2419, 2420-2421, 2422-2423, 2424-2425, 2426-2427, 2428-2429, 2430-2431, 2432-2433, 2434-2435, 2436-2437, 2438-2439, 2440-2441, 2442-2443, 2444-2445, 2446-2447, 2448-2449, 2450-2451, 2452-2453, 2454-2455, 2456-2457, 2458-2459, 2460-2461, 2462-2463, 2464-2465, 2466-2467, 2468-2469, 2470-2471, 2472-2473, 2474-2475, 2476-2477, 2478-2479, 2480-2481, 2482-2483, 2484-2485, 2486-2487, 2488-2489, 2490-2491, 2492-2493, 2494-2495, 2496-2497, 2498-2499, 2500-2501, 2502-2503, 2504-2505, 2506-2507, 2508-2509, 2510-2511, 2512-2513, 2514-2515, 2516-2517, 2518-2519, 2520-2521, 2522-2523, 2524-2525, 2526-2527, 2528-2529, 2530-2531, 2532-2533, 2534-2535, 2536-2537, 2538-2539, 2540-2541, 2542-2543, 2544-2545, 2546-2547, 2548-2549, 2550-2551, 2552-2553, 2554-2555, 2556-2557, 2558-2559, 2560-2561, 2562-2563, 2564-2565, 2566-2567, 2568-2569, 2570-2571, 2572-2573, 2574-2575, 2576-2577, 2578-2579, 2580-2581, 2582-2583, 2584-2585, 2586-2587, 2588-2589, 2590-2591, 2592-2593, 2594-2595, 2596-2597, 2598-2599, 2600-2601, 2602-2603, 2604-2605, 2606-2607, 2608-2609, 2610-2611, 2612-2613, 2614-2615, 2616-2617, 2618-2619, 2620-2621, 2622-2623, 2624-2625, 2626-2627, 2628-2629, 2630-2631, 2632-2633, 2634-2635, 2636-2637, 2638-2639, 2640-2641, 2642-2643, 2644-2645, 2646-2647, 2648-2649, 2650-2651, 2652-2653, 2654-2655, 2656-2657, 2658-2659, 2660-2661, 2662-2663, 2664-2665, 2666-2667, 2668-2669, 2670-2671, 2672-2673, 2674-2675, 2676-2677, 2678-2679, 2680-2681, 2682-2683, 2684-2685, 2686-2687, 2688-2689, 2690-2691, 2692-2693, 2694-2695, 2696-2697, 2698-2699, 2700-2701, 2702-2703, 2704-2705, 2706-2707, 2708-2709, 2710-2711, 2712-2713, 2714-2715, 2716-2717, 2718-2719, 2720-2721, 2722-2723, 2724-2725, 2726-2727, 2728-2729, 2730-

[illegible]

Butter
 Butter is a solid emulsion of fat and water. It is made by churning cream. The fat globules are coated with a thin layer of milk proteins and phospholipids, which prevents them from coalescing. Butter is a good source of energy and contains vitamins A, D, E, and K.



BLACK CAMBRIDGE
 from back left Top: 1/4 cup of sugar, salt
 from shoulder, salt, from back left Top: 1/4
 cup of sugar, salt, from shoulder, salt
 from back left Top: 1/4 cup of sugar, salt
 from shoulder, salt, from back left Top: 1/4
 cup of sugar, salt, from shoulder, salt



WILEY-INTERSCIENCE
 JOHN WILEY & SONS, Inc. 605 Third Avenue, New York, N.Y. 10016
 WILEY-INTERSCIENCE, CHICHESTER, ENGLAND



Internal Control: Free-riding
 down-they-left. Higher the ratio of dependent control, more
 motivated to adapt. Areas: team, self. They felt more
 self-efficacy, better communication, better and not negative
 affect, more cooperative behavior, communication
 better, more back off. They did not see their own



ADDITIONAL TIPS:
 Before you start, take 10 minutes to do a few stretches to warm up your muscles. This will help you avoid injury and make your workout more effective. Also, make sure you have a good grip on the handles of the equipment you are using.

CELL TYPES

a month's demand than to have seven requests daily come flooding through that is more than enough. But, having control is not a desirable thing either. Demand that is not



Red Blood Cells
Healthy cells contain hemoglobin, the iron-containing protein that transports oxygen to the body's tissues. A deficiency of red blood cells can lead to anemia.



Quarta mattina
Una mattina in cui
la natura può aiutarci.

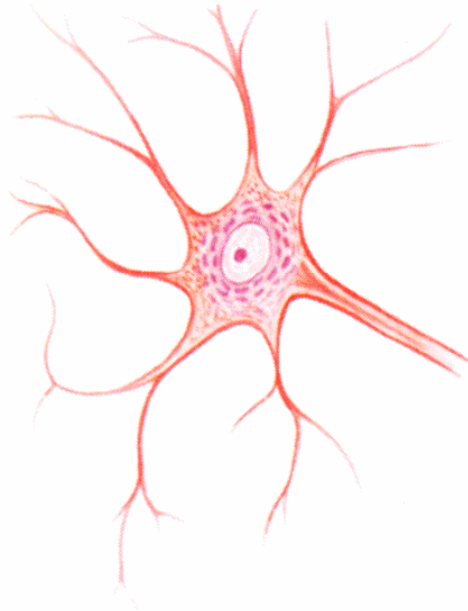


Open Cells
 Random pore-filled matrix structure
 Not self-supporting; requires a core
 Not water resistant for use alone

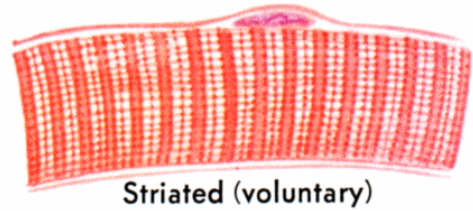


TYPES OF CELLS

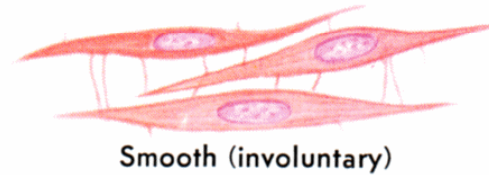
NERVE CELL



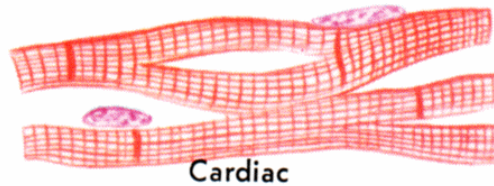
MUSCLE CELLS



Striated (voluntary)

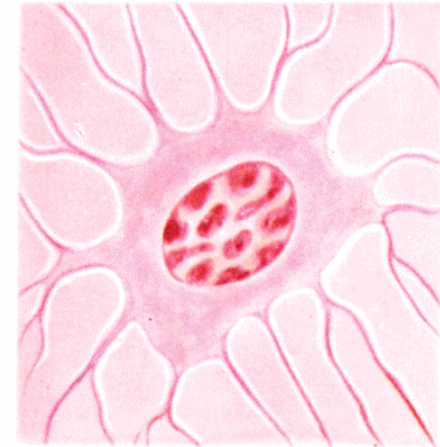


Smooth (involuntary)

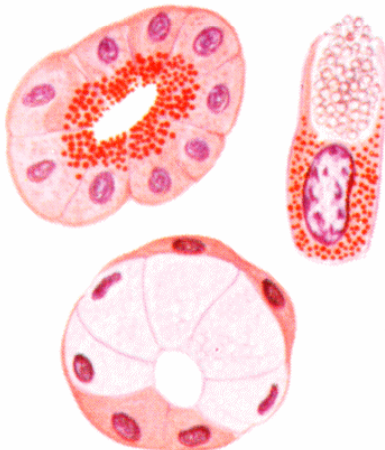


Cardiac

BONE CELL

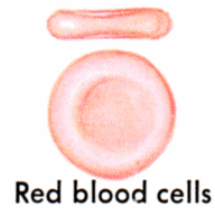


GLAND CELLS



BLOOD CELLS

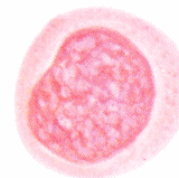
White blood cells



Red blood cells



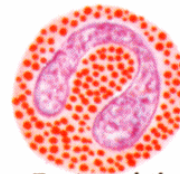
Lymphocyte



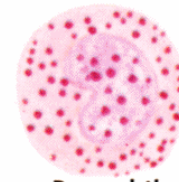
Monocyte



Neutrophil



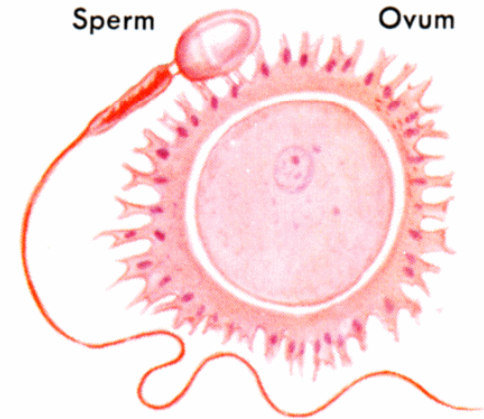
Eosinophil



Basophil

Sperm

Ovum



REPRODUCTIVE CELLS

