Use the following information to answer the following questions about your organism:

Is your organism a prokaryote or a eukaryote?

If it is a prokaryote, is it in the bacteria or archaea group?

What is this organism's metabolism?

Where does it get its carbon?

Where does it get its energy?

Where do would you most likely find this organism? (you may need to use the internet for this question)

Be prepared to provide your answer to the class.

All materials with answers will be posted on blackboard and this material will be on the exam.

SUMMARY TABLE 29.1 Characteristics of Bacteria, Archaea, and Eukarya

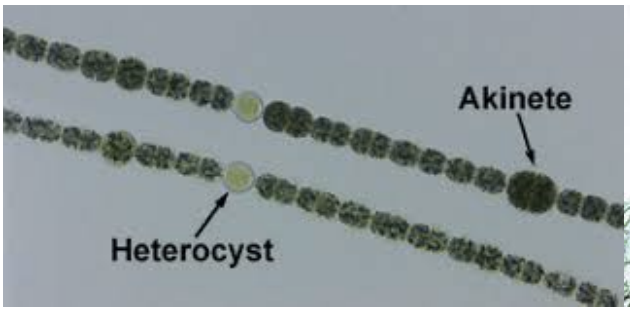
	Bacteria	Archaea	Eukarya
DNA enclosed by a nuclear envelope? (see Chapter 7)	No	No	Yes
Circular chromosome present?	Yes (but linear in some species)	Yes	No (linear)
Organelles enclosed by membranes present? (see Chapter 7)	No	No	Yes
Rotating flagella present? (see Chapter 7)	Yes	Yes	No (flagella and cilia undulate)
Multicellular species?	No (with some exceptions)	No	Yes
Plasma membrane lipids composed of glycerol bonded to unbranched fatty acids by ester linkages? (see Chapter 6)	Yes	No (branched lipids bonded by ether linkages)	Yes
Cell walls, when present, contain peptidoglycan? (see Chapter 5)	Yes	No	No
RNA polymerase composed of >10 subunits?	No (only 5 subunits)	Yes	Yes
Translation initiated with methionine? (see Chapter 17)	No (initiated with *N*-formylmethionine; *f*-met)	Yes	Yes

Contains histone proteins No

yes yes

SUMMARY TABLE 29.3 Six General Methods for Obtaining Energy and Carbon–Carbon Bonds

		Source of C–C Bonds (for synthesis of complex organic compounds)	
		Autotrophs: self-synthesized from CO_2, CH_4, or other simple molecules	**Heterotrophs:** from molecules produced by other organisms
Source of Energy (for synthesis of ATP)	**Phototrophs:** from sunlight	photoautotrophs	photoheterotrophs
	Chemoorganotrophs: from organic molecules	chemoorganoautotrophs	chemoorganoheterotrophs
	Chemolithotrophs: from inorganic molecules	chemolitho[auto]trophs	chemolithotrophic heterotrophs




ANABENA

No membrane bound organelles, including the photosynthetic mechanism (no chloroplasts)

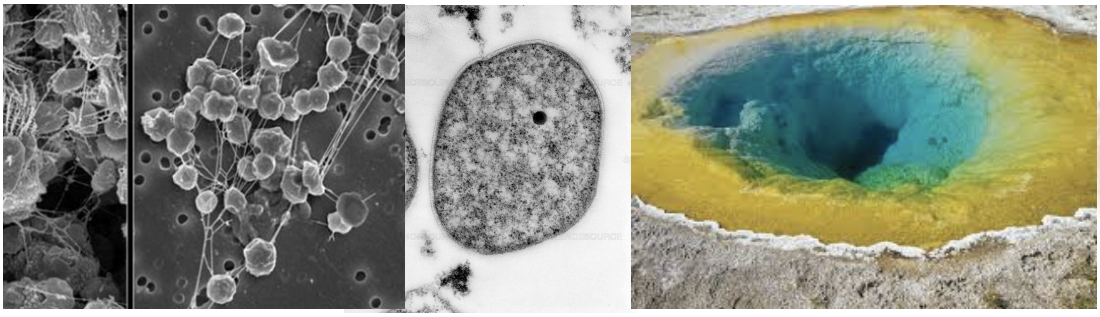
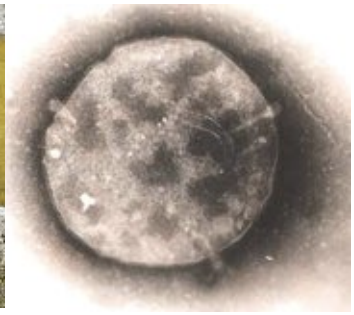
Heterocycts change gaseous N_2 into biologically available nitrogen

Gets its carbon from CO_2 during photosynthesis

Some species native to Iowa

Anabena does not generally produce histone proteins



CRENARCHAEOTA

Name is Greek for “old spring quality” because the first strains were isolated from sulfur vents. These strains oxidize ammonia (NH_3) or sulfur compounds for energy.

Can live at the highest temperatures of all known organisms

All groups of Crenarchaeota have circular DNA and most have histone proteins

Crenarchaeota do not photosynthesize

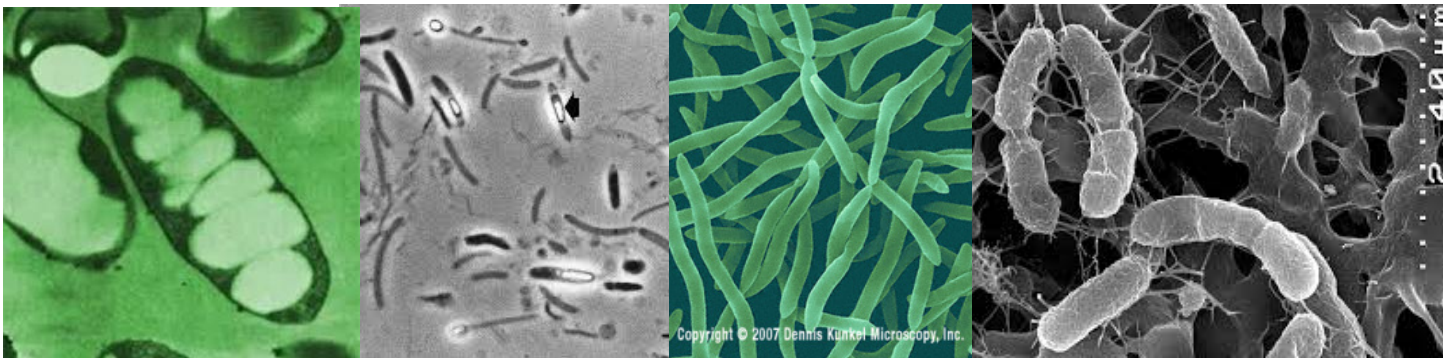
HELIOBACTERIA

Are gram+, meaning their cell walls contain peptidoglycan

Require organic carbon sources

Its photosynthetic apparatus is disabled by O_2, therefore it is an obligate anaerobe.

Fixes nitrogen in rice agriculture

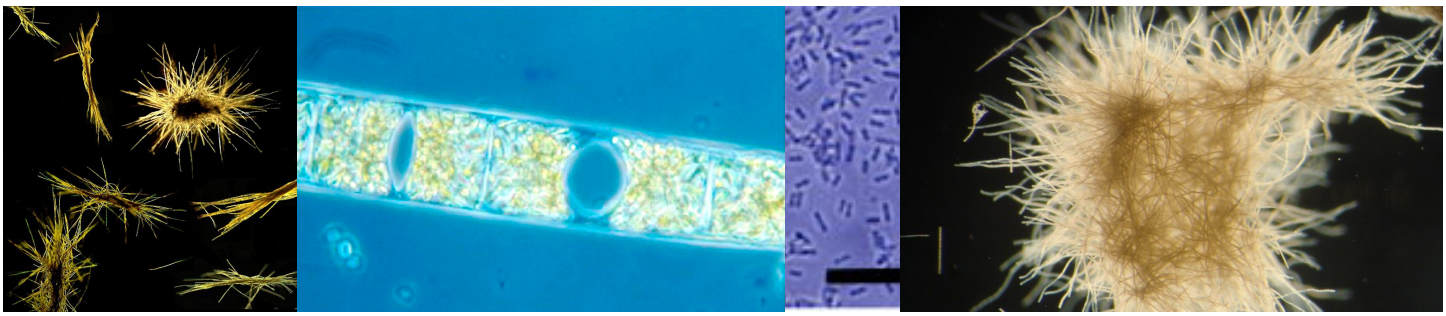


HUMAN (*Homo sapiens*)

Each cell contains a nucleus and mitochondria

Energy and carbon are derived from eating other organisms

Have colonized every terrestrial ecosystem type on Earth



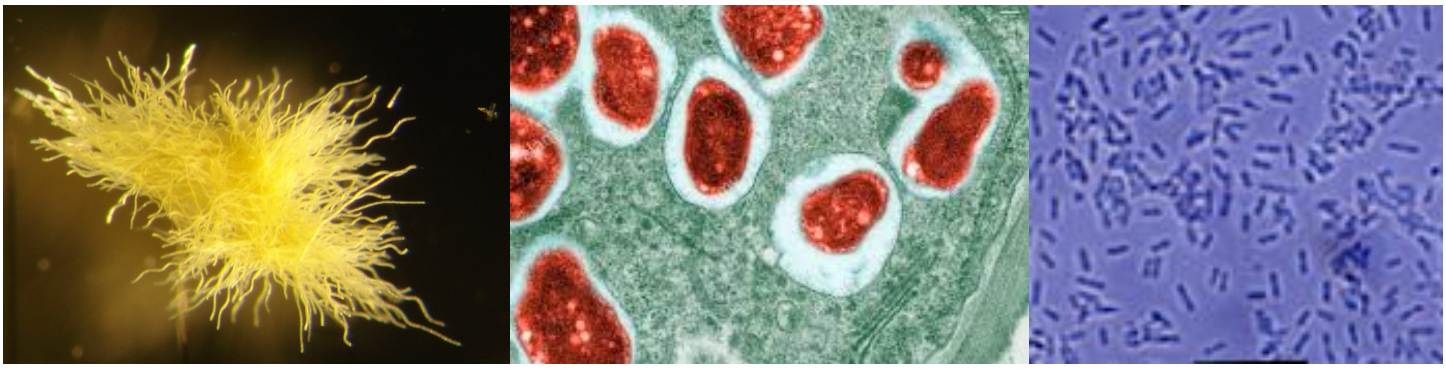
DIAZOTROPH

Lacks a nucleus

Uses carbon from the atmosphere

Uses root exudates (simple carbon compounds) for energy

It is unclear if it is a bacteria or archaean

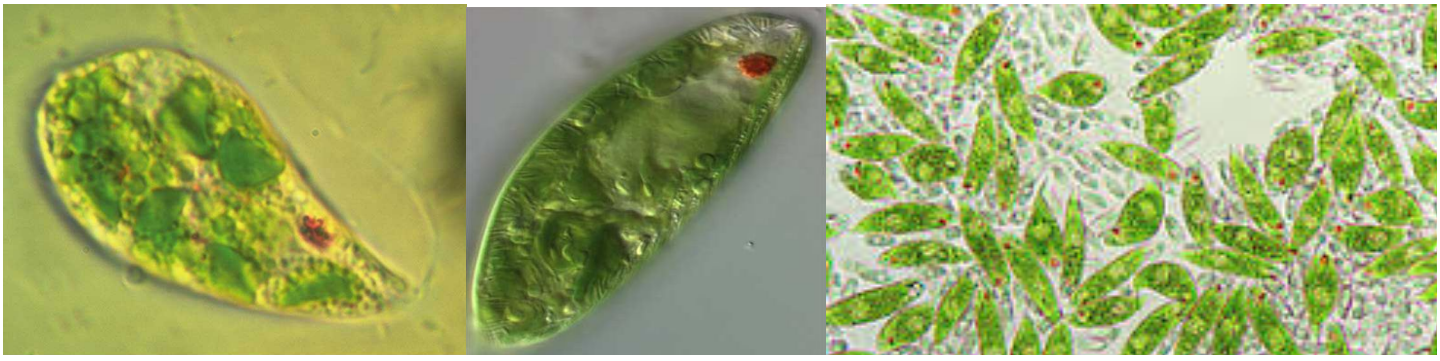


EUGLENA

Contains chloroplasts (organelles that photosynthesize)

Undulating flagella help it swim

Its breathes CO_2 dissolved in water



FIRMICUTES

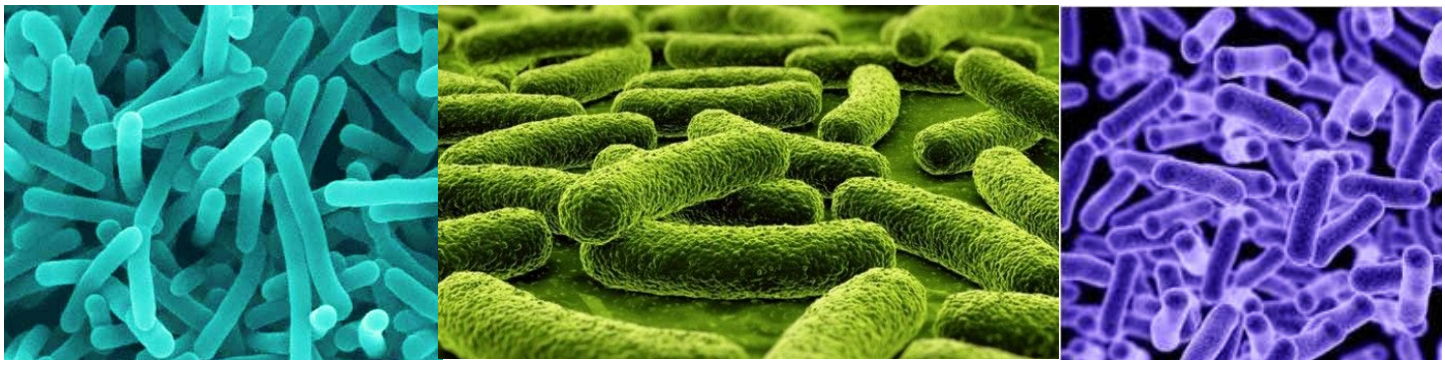
No nucleus, only a ring of a DNA

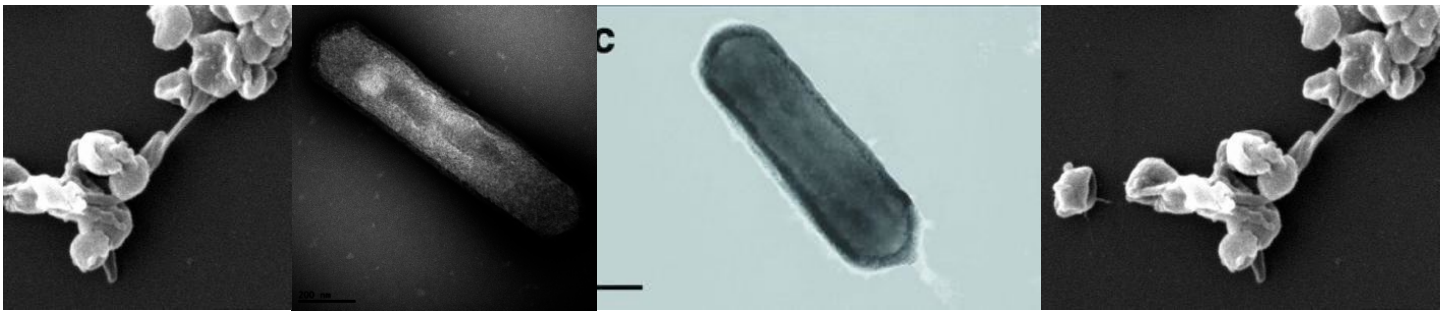
Although a few Firmicute species can photosynthesize, most consume organic materials for energy

Many species have gram+ cell walls, which contain peptidoglycan

These organisms also get their carbon from organic materials

Some species are an important component of our digestive microbiome





Thaumarchaeota

One of the most abundant genera on Earth. They live in its largest habitat.

Oxidize ammonia to fix CO_2

Have no membrane-bound organelles

Have large RNA (>10 subunits)