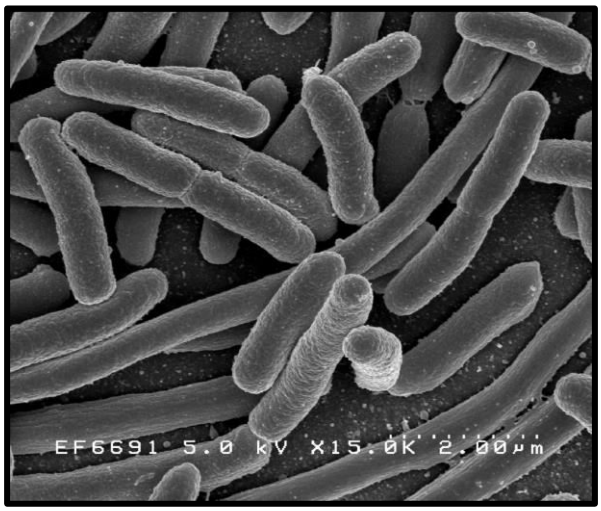
Introduction to Microbes

- **Bacteria**
  - Bacteria are **unicellular**, **prokaryotic organisms** that can be found in most places that meet their individual requirements, usually warm, moist environments
    - Prokaryotic meaning no nucleus
  - They are also both smaller than eukaryotes and only range to a few micrometres in length
  - They also have no membrane bound organelles
  - They have **70s** ribosomes as opposed to eukaryotic **80s** ribosomes
  - Bacteria come in a range of shapes:
    - Rod shaped – **Bacilli**
    - Round, circular shaped – **Cocci**
    - Other shaped bacteria have been found too
  - The right image is a scanning electron micrograph of *Escherichia coli*.



- **Archaea**
  - Archaea are another branch of **unicellular prokaryotes**
  - Archaea were initially classified as being a subcategory of bacteria (named **archaebacteria**), however there are many differences in the 2 domains that make it an outdated classification
    - The differences range from morphological to physiological
      - Some archaea are flat and square shaped such as *Haloquadratum walsbyi*
      - Another difference is that archaea rely on ether lipids in their cell membrane as opposed to bacteria that rely ester lipids and peptidoglycan
      - Finally, they are found in places that most bacteria cannot tolerate, such as hot springs and volcanos
      - The main difference that separates archaea as a new domain however, is their differences in rRNA compared to bacteria or eukaryotes
        - The 16s rRNA contains species specific information about protein production
        - **There tuned out to be a group of methanogens that differentiated vastly to both eukaryotes and bacteria**
          - Methanogens are microorganisms that produce methane as a metabolic by-product in anoxic conditions, they are exclusive to archaea
  - The following image shows a transmission electron micrograph of *Methanosaeta harundinaceae*