Taxonomy of Microbes Part 2

- Phenotypic characteristics can be used to identify microorganisms without the need for sophisticated 0 equipment
 - This includes the **size** and **shape**
 - This can allow quick identification
 - Based on size and shape, the organism can be split in to: .
 - Prokaryote, fungus or protozoan
- The Gram stain differentiates between Gram positive and Gram negative bacteria 0
 - It rapidly narrows the number of possible organisms
 - However, the Gram stain alone is not enough
 - Streptococcus pyogenes, for example, cannot be distinguished from streptococci that are part of the normal throat microbiota
 - In certain cases, the Gram stain result is enough to start antibiotic treatment
 - For example, a Gram stain of sputum showing numerous white blood cells and Gram positive diplococci is highly suggestive of Streptococcus pneumoniae
 - In other cases, the Gram stain can be enough for diagnosis
 - The presence of Gram negative diplococci clustered in white blood cells in a sample of a urethral secretion from a man is highly suggestive of Gonorrhoea
- Certain microorganisms can be identified using special stains 0
 - For example, acid-fast bacteria can be quickly identified using the Ziehl-Neelstins and e.C
- The morphology of the colony can give initial clues to identify the second 0
 - For example, *Serratia marcescens* are often religible to the production of **pigment**Other morphological features include:
 Shape
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 - - eW Margin Texture
- The metabolic capabilities can give clues to the organism's identity, some such capabilities include: 0
 - The type of sugars it ferments
 - The end products it makes •
- Biochemical tests can be conducted to determine an isolates metabolic capabilities, some are fast, some 0 can take at least 18 hours to incubate. Some tests include:
 - Tests to look for the enzyme **catalase** (breaks down hydrogen peroxide in to water and oxygen)
 - Test to search for the lysine decarboxylase enzyme
 - The indole test to detect the enzymatic removal of the amino group from tryptophan
- Serological tests use antibodies to detect specific proteins and polysaccharides 0
 - Such as the O antigens in the LPS structure on Gram negative bacteria
- An organism's protein profile can now be found in under 15 minutes using a Matrix Assisted Laser 0 Desorption Ionisation Time of Flight Mass Spectrometry (MALDI-TOF MS)
 - This finds the chemical composition of a sample by measuring the masses of various components •
- Nucleic acid probes and nucleic acid amplification tests (NAATs) can be used to detect the nucleotide 0 sequence of a given species
 - The probe can locate a nucleic acid sequence that characterises a specific species