from pre-existing cells for three main reasons: the cell was a highly complex structure, cell numbers do not increase without cell division, and viruses (which are not living) can only reproduce inside living cells.

If we say that cells can only be formed from pre-existing cells dividing we must then theorise over how the first living cell arose from non-living material, assuming cells did not arrive from elsewhere in the universe. However, as we previously acknowledged, the cell is a complex structure and it is difficult to imagine how this could have arisen through evolution. There are theories over how some of the key stages could have occurred. Firstly by creating a mixture of methane, hydrogen and ammonia we can create an approximation of the original atmosphere of the earth, by charging these with electricity (a simulation of lightning) it is possible that carbon and amino acids necessary for life were formed. These was discovered by Stanley Miller and Harold Urey in the 1950's. Then follows the assembly of polymers, it is suggested that a mixture of inorganic chemicals combine with the energy from cracks in the earth's surface in deep sea vents allowed the accumulation of carbon compounds into polymers. The third main stage is more easily explainable, if phospholipids were among the carbon compounds as they formed polymers it is shown that the phospholipids would naturally form bilayers and vesicles to allow for a plasma membrane in a small cell, thus allowing for reactions internally to develop. Lastly, the theory for developing the ability to replicate and inherit. It is difficult as DNA requires enzymes, whilst enzymes cannot exist without genes. However, what has been suggested is that RNA used to contain the genetic material in the same way DNA now does, yet RNA is able to self-replicate using itself as a catalyst. Therefore, using a selection of theories we are able to suggest how life could have arisen on our planet.

Another development that we have theorised over is the origin of eukarteric cells, cells with a nucleus, this we have explained through endosymbiosis. An a development cells, cells with a nucleus, this we have explained through endosymbiosis. An a development cells, cells with a nucleus, this we have explained through endosymbiosis. An a development cells, cells with a nucleus, this we have explained through endosymbiosis. An a development cells, cells with a nucleus, this we have explained through endosymbiosis. An a development cells is one in which both participants are benefited, in this case the participants are small free-living prokaryotes and large prokaryotes. Mitochondria word \$ n ll free-living prokaryotes with the ability to aerobically respire, whereas large pokaryotes could only respite anaerobically. Therefore, instead of taking them in by endowroots and digesting development is provided energy from aerobic respiration, whilst the large prokaryote supplied the mitochondria with food. Over years of evolution Mitochondria have become a part of the normal cell make up of a eukaryote cell, however there is evidence that they were once independent organisms, for example they have their own genes and 70S ribosomes, they have mRNA to perform proteinsynthesis and they can only be produced through self-replication. It is also though that a prokaryote that evolved to be able to photosynthesis was taken in by a larger prokaryote and today these have developed into chloroplasts in plant cells.

Therefore, we have theorised that all cells are created from pre-existing cells. Through the experiments of the likes of Pasteur the theory of spontaneous generation was falsified and thus cell theory came to be. However the first cell and life form on earth was likely created through a series of steps with the right conditions, for example the reaction of amino acids through lightning and the correct make up of atmosphere. We have also tracked the development of prokaryotes to eukaryotes through the introduction of small prokaryotes to create an endosymbiotic relationship which benefits both organs and has allowed for the evolution of the more complex structure of specialised cells that we have today.