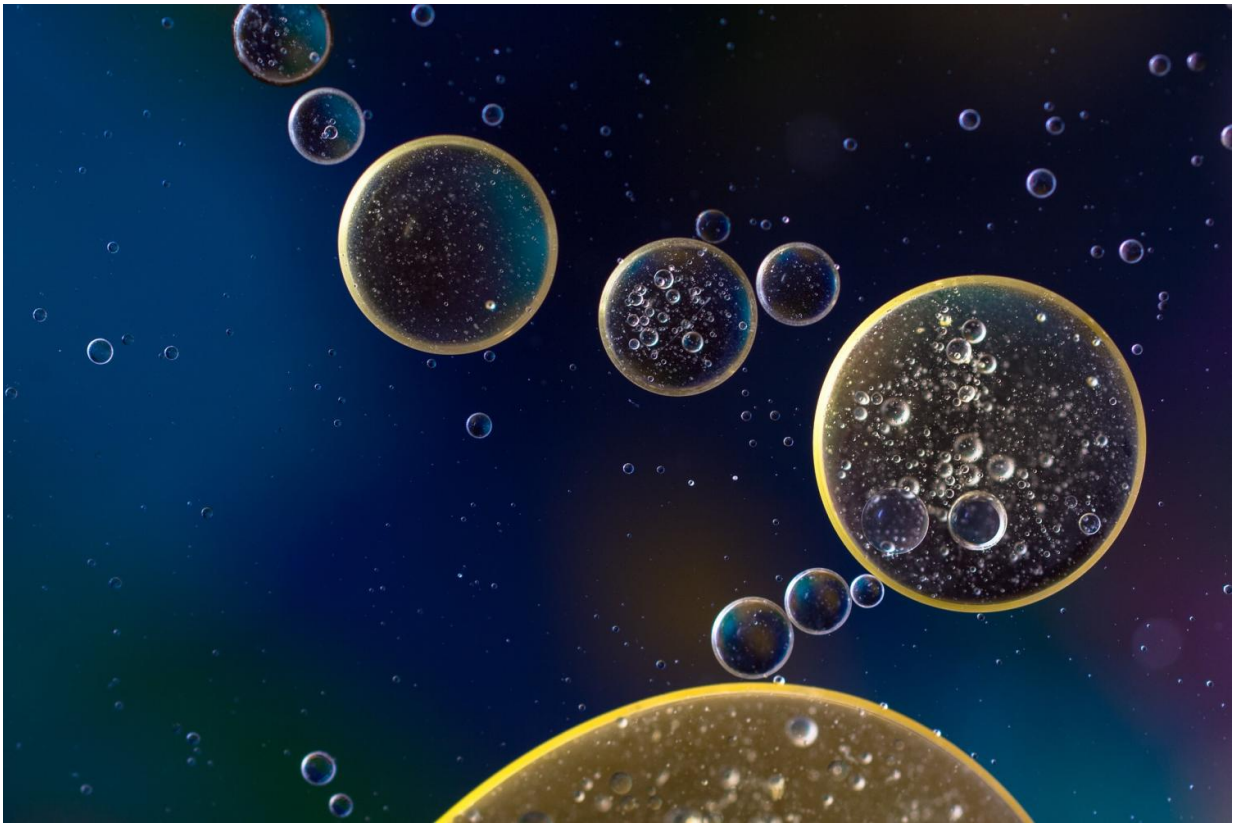
Researchers make synthetic polymers inside of living cells

April 22 2019, by Bob Yirka



Credit: CC0 Public Domain

A team of researchers at the University of Edinburgh has demonstrated that it is possible to create synthetic polymers inside of living cells. In their paper published in the journal *Nature Chemistry,* the group

describes how they pulled off this feat and suggest their work opens the door to new possibilities for modulating cellular function.

The researches note that in the past, scientists have created polymers in the presence of living cells—mostly as a means for encapsulating them to allow engineering to occur. They also note that it was believed that synthetic polymers could not be created inside of cells because of the presence of free-radical scavengers—creating polymers requires adding free-radicals to a mixture of monomers. In this new effort, the researchers have proved this belief wrong by creating polymers inside of living cells in their lab.

The researchers report that they began their effort by theorizing that free-radical scavengers inside of a cell would not be able to respond to the presence of radicals quickly enough to prevent polymerization from occurring. Their process started with adding a photoinitiator molecule to a human cell culture—which was absorbed. The team then added biocompatible monomers to the cell culture which were also absorbed into the cell. The team then shined a UV light on the cell allowing free-radicals to be released from the photoinitiator. The free radicals reacted with the monomer building blocks (faster than the scavengers could respond to their presence, as predicted) resulting in the creation of a polymer. The researchers report that using different monomers resulted in the creation of different polymers—some were even fluorescent. They note that some of the polymers became nanoparticles and some changed the way the cells behaved or moved.

The team suggest that the knowledge that it is possible to create polymers inside of living cells is likely to instigate work by other research teams who will want to investigate the various possibilities imagined with polymers inside of cells. They further suggest it might even open up a new area of chemical biology. Meanwhile, the team plans to continue their own research to better understand the impact polymers

have on cells when created inside of them and whether the cells can survive as long as they normally would.

More information: Jin Geng et al. Radical polymerization inside living cells, *Nature Chemistry* (2019). DOI: 10.1038/s41557-019-0240-y