

White light spectroscopy for monitoring and quality control of cultures of mammalian cells / CAR-T cells: an old/new technique

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Advanced Therapy Medicinal Products (ATMPs) are at the cutting edge of medicine discovery. These personalized medicines reflect a shift in medicine towards curative therapies instead of chronic therapies. They have undergone important advancements to gain in efficacy, precision, scalability, and safety. However, their development and manufacturing still face important challenges, such as long development times and expensive manufacturing processes.

One of the main challenges is to determine cell concentration and monitor cell cultures. Cell concentration is determined either by counting cell under microscope or with automatic counters, in small volume not always representative of culture flask. These traditional methods involve sampling, which could introduce contaminants. Therefore, it is necessary to develop new methods to monitor cell proliferation, to detect contamination without sampling, and ideally in real time. Diverse techniques have been developed in the last years but none of them completely allow measurements in real time without sampling of mammalian cells.

With the help of the old/new white light spectroscopy technique, we have developed new way to monitor cell cultivation, determine their concentration in real time and without sampling and evaluate the quality of cell cultures. After a proof of concept on T lymphoblast suspension cell line, primary T cells from donors were also studied.

White light spectroscopy has proven to be an ideal candidate for monitoring CAR T-cell production as it allows concentration and culture dynamics to be measured in a closed-loop system without sampling and monitoring results to be displayed in real time. This would greatly simplify the production process, drastically reduce the risk of contamination by eliminating the need for sampling, and directly reduce the cost of therapy.