New perspectives of drug targeting by molecular imprinting

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Molecular recognition is crucial for molecules used in various technological applications, especially in life sciences. Natural molecules like antibodies can selectively bind biologically important compounds, making them valuable for diagnostics, drug delivery, and research. However, traditional antibodies have limitations, including limited stability, high production costs, and ethical concerns.

An alternative to natural antibodies is synthetic antibodies made from polymers using Molecular Imprinting Technology. Molecularly Imprinted Polymers (MIPs) are created by polymerizing monomers around a template molecule, granting them the ability to selectively recognize and bind target analytes. MIPs can be engineered to recognize specific parts of proteins, making them useful for detecting and interacting with particular components of viruses or bacteria.

In recent years, due to the global impact of SARS-CoV-2 (COVID-19), MIPs have been developed to recognize parts of the virus, such as the spike protein, and have shown potential in inhibiting viral infection. These synthetic antibodies offer a promising approach for both diagnostic and therapeutic applications in combating viral and bacterial infections.

In conclusion, the synthesized MIPs provide a robust, cost-effective alternative to conventional antibodies, offering significant potential in selective molecular recognition. Beyond their application in combating viral and bacterial infections, including COVID-19, MIPs also hold great promise in oncological targeting. Their ability to be engineered to recognize specific protein markers associated with cancer cells positions them as a powerful tool for the development of targeted cancer therapies and diagnostics, paving the way for more precise and effective treatment strategies in oncology.