

Recent Trends in Electronic Biosensing

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The race between optical detection principles (fluorescence, surface plasmons, optical waveguides, etc.) and electrical/ electrochemical/ electronic concepts for bio-diagnostics is not decided yet. Both scientific communities continue to offer solutions for fast, multiplexed, simple and cheap detection of peptides, proteins, oligonucleotides, PCR amplicons, small molecules like odorants, etc. Most likely, the competition will never see a single winner that meets all needs because the different practical formats and boundary conditions for applications, as well as market requirements may ask for specific and unique solutions that could be better achieved in one case by optics and in another situation by electronics.

Currently, optical biosensing seems to be more advanced with several commercial instruments being very successful positioned in the market. However, recent years have seen very promising examples of electronic sensing, based on (bio-) functionalized transistors. We will briefly discuss the different concepts of surface-plasmon optical vs. electronic sensing, will summarize a few examples of bio-sensing with graphene-based field-effect transistors from our own group, and then give an outlook of the potential in combining both approaches in just one instrument.