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Scattering; 2.2.2 Brain Spectroscopy; 2.2.3 Fick's Law Applied to Brain Blood Flow; 2.2.4 Practical Details; 2.2.5 NIRS Instrumentation; 2.3 Pulse Oximetry; 2.3.1 Theory; 2.3.2 Empirical Calibration; 2.3.3 Clinical Use; 2.4 Laser Doppler Flowmetry
2.4.1 Light Scattering and Doppler Shift of Laser Light
2.4.1.1 Elastic and Quasi-Elastic Scattering; 2.4.1.2 Doppler Shift; 2.4.2 Instrumentation; 2.4.3 Fiber Optics Geometry and Fiber Types; 2.4.4 Signal Processing Principles; 2.4.5 Calibration and Standardization of LDF Flow Meters; 2.4.6 Standardization; 2.4.7 Applications of the Laser Doppler Principle; 2.5 Conclusions; 2.5.1 Advantages; 2.5.2 Disadvantages; 2.6 References; 3 Biosensors for Monitoring Glucose; 3.1 Introduction; 3.2 Diabetes and the Need for Glucose Monitoring; 3.3 Monitoring Principles: Transducers
3.4 Monitoring Principles: Enzymes
3.5 Manufacturing Issues; 3.6 First Generation Amperometric Glucose Biosensors; 3.7 Catalytic Transducers; 3.8 Mediated Devices; 3.9 Currently-Available Home Blood Glucose Monitors; 3.10 Currently-Available Laboratory Analyzers for Monitoring Glucose; 3.11 Direct Electron Transfer Systems; 3.12 Implantable Glucose Sensors; 3.13 Minimally-Invasive Systems; 3.14 Non-Invasive Systems; 3.15 References; 4 Biomagnetic Imaging: Principles of Magnetic Resonance Imaging and Emerging Techniques in Progress; 4.1 Introduction; 4.2 Magnetic Resonance Signal
4.2.1 Electromotive Force (EMF)
4.2.2 Relaxation Times; 4.3 Overview of the Spin-Warp Imaging Method; 4.3.1 Recognition of Spins Distributed in the First Direction; 4.3.2 Recognition of Spins Distributed in the Second Direction; 4.3.3 Recognition of Spins Distributed in the Third Direction; 4.3.4 k-Space; 4.3.5 Image Contrast; 4.4 Diversification of MRI Application Techniques; 4.4.1 Magnetic Resonance Angiography (MRA); 4.4.2 Perfusion and Diffusion Imaging; 4.4.3 Functional Imaging (fMRI); 4.4.4 Magnetic Resonance Spectroscopy (MRS); 4.5 Imaging of Impedance Distribution of the Brain
4.5.1 Principles

Sommario/riassunto

Due to remarkable developments in the field of sensors along with miniaturization, sophisticated microsensors are part of many aspects of 21st century medicine and health care. Turning sensory inputs of all kinds into defined electrical signals that can be interpreted and acted upon by both stationary and portable medical equipment as well as implants, sensors find many applications monitoring blood pressure, heart rates, glucose levels and many other parameters by which human health can be evaluated. They also serve as key components in modern imaging equipment as well as operating equipment
