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Plenaire lezing

Quantitative nucleic acid amplification techniques heralding clinical laboratory unification for risk prognosis, disease staging and therapy monitoring

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Clinical laboratory diagnostics in the Netherlands is split up in disciplines like pathology, clinical chemistry, immunology, endocrinology, bacteriology and virology. Recently, the narrow window of discipline-oriented diagnostics has been shaken up. Three major developments have changed the way we look at and practice laboratory diagnostics for good:

1. the phenomenal success of multidisciplinary research in the natural history and treatment of disease, in particular infectious diseases
2. the development of uniform diagnostic tools for a myriad of diseases
3. the improvement of electronic communication and bioinformatics

The best examples to illustrate these developments are AIDS, hepatocellular carcinoma and Kaposi Sarcoma.
Following the identification of HIV as the cause of AIDS, serology has been implemented to prevent virus transmission and identify individuals in need of chemoprophylaxis of AIDS; subsequently nucleic acid amplification technologies like PCR, 3SSR or NASBA and LCR as well as signal amplification techniques were discovered and it was shown that viral RNA levels in blood as tested by quantitative assays, are the best predictor of clinical outcome. Today, triple therapy is so effective that with proper use resistance in the short run is a minor problem and quantitative assays become obsolete, since HIV infected individuals have undetectable HIV RNA levels within weeks of therapy initiation.
Hepatitis C virus, a major cause of hepatocellular carcinoma, was even discovered with molecular techniques as was the herpes virus HHV8, related to Kaposi Sarcoma.
These developments show that viruses are no longer discovered and no longer monitored with virus-specific technologies, but with generic molecular technologies. These developments require that clinical laboratories should be unified around generic technologies and form one multidisciplinary lab for each region or hospital, either physically linked or as virtual laboratory.
The focus of these labs should be in the research and development area on genomics, combinatorial chemistry, molecular biology and bioinformatics and in the clinical service area on robotics, automation and electronic communication.