Elecsys® with ECL technology
Still light years ahead
The unique technology behind Elecsys® immunoassays

ECL – ElectroChemiLuminescence

ECL technology is Roche’s highly innovative detection technology for heterogeneous immunoassays.

Since the launch of the first Elecsys 2010 analyzer for small to mid-range laboratories in 1996, the extraordinary success story of the Elecsys platform and ECL technology has continued to set the standard in immunochemistry. More than 30,000 instruments* testify to the outstanding success of Elecsys systems, assays and the ECL technology. Every second, 30 results are reported in laboratories all over the world, amounting to more than one billion tests in 2011.

The Elecsys 2010 analyzer and its successor systems, MODULAR E170, cobas e 601 module, cobas e 602 module and cobas e 411 analyzer are designed to reduce the complexity in laboratory operation and provide efficient and compatible solutions for network cooperation. The cobas e modules are part of the cobas® modular platform which includes cobas 4000 and cobas 6000 analyzer series and cobas 8000 modular analyzer series. This concept is based on a common architecture that delivers tailor-made solutions for diverse workload and testing requirements.

Designed for the professional IVD user, Elecsys with ECL technology combines innovative technologies with accurate, precise and reliable patient results which contribute to better patient care.

* Status 2011
Fast, accurate, precise and reliable patient results

The power of ECL technology

ECL is a highly innovative technology with distinct advantages
• Extremely stable non-isotopic label for long onboard stability and economic use of reagents
• High sensitivity for patient-friendly low sample volumes and fast results due to short turnaround times
• Broad measuring range for fewer repeats and a streamlined workflow
• High precision over the entire measuring range for reliable results
• Applicable for the detection of all analytes for a broad assay menu including innovative markers

Elecsys® diagnostic markers with advanced assay design
• Robustness against interference (e.g. HAMA) due to a multidimensional approach: blocking proteins, fragmented catcher or tracer antibodies or chimeric antibodies
• Reference-traceable results with high lot-to-lot stability allows for accurate long-term monitoring
• Unique reagent concept with ready-to-use, failsafe and convenient e-packs for consistent handling
• Consistently precise results across cobas® immunochemistry platforms based on standardized reagents and low system-immanent variability
Broad and innovative assay menu

ECL immunoassay principle

The strong streptavidin-biotin bond is used to affix the antigen/antibody complex to a paramagnetic microbead.

Several immunoassay types are feasible, including competitive, sandwich and bridge assays – even nucleic acid applications are possible.

The affinity of streptavidin to biotin is one of the strongest non-covalent interactions known in nature and is resistant to organic solvents, denaturants, detergents, proteolytic enzymes, and extremes of temperature and pH.

Paramagnetic microbeads enable a controlled capture and release of the antigen/antibody complex through the application of magnetic forces.
Full control inside the measuring cell
ECL signal generation and detection

**Magnetic bound/free separation:**

- The solution containing sample and reagents is aspirated into the measuring cell. A magnetic field is applied, and the paramagnetic beads bind to the surface of the measuring cell.
- ProCell solution is introduced in order to separate the bound immunoassay complexes from the free remaining particles and to provide tripropylamine (TPA), which is essential for the ECL-reaction.
High on-board stability and economic usage of reagents

**Controlled reaction with voltage as trigger**

The use of voltage eliminates problems associated with reagent adding/mixing and ensures a precisely controlled reaction.

**Controlled reaction with voltage as reaction trigger:** To start the reaction, voltage is applied between the working and counter electrode, and an electrical field is created, ensuring a precisely controlled and timed reaction.

**Highly stable reactants:** Two electrochemically active substances, the ruthenium complex and the TPA, are involved in the reaction that leads to the emission of light. Ruthenium and TPA are non-isotopic and highly stable at base state. Only when voltage is applied and the labeled compound is repeatedly excited do the reactants begin emitting photons.
Streamlined workflow through excellent low-end sensitivity paired with high precision over the entire measuring range.

Enhanced sensitivity and broad measuring ranges

Cyclic amplification of the signal

The ECL process continuously regenerates the ruthenium label, enabling multiple signal cycles during measurement.

Precise, reproducible signal: Through cyclic amplification of the signal, a peak of light emission can be continuously reproduced and accurately detected by a photomultiplier.

High sensitivity and broad measuring range: The resulting ECL reaction creates a signal response which is linear over more than six orders of magnitude.
Advantages of ECL technology

Enabling fast, precise, accurate and reliable patient results

**Rapid response times**
- Short incubation times: 18 minutes for the majority of assays
- 9-minute STAT applications for emergency samples

...for faster reporting of patient results

**Wide measuring range**
- Linear signal response over six orders of magnitude

...for fewer dilutions and repetitions

**Low sample volume**
- High analytical sensitivity enables low sample volumes
- Patient-friendly 10-50 μl per test

...for fewer samples in the lab and a streamlined workflow

**Controlled reaction**
- High on-board stability and long shelf-life due to highly stable constituents

...for continuous availability of both, routine and esoteric parameters

**Precision & sensitivity**
- Superior low-end detection limits
- Excellent precision over the entire measuring range

...for accurate and precise patient results
Elecsys diagnostic markers and cobas® modular platform

Power play between reagents and systems

Proven Elecsys® performance
- Advanced assay design based on state-of-the-art ECL technology with low sample volumes, short turn around times, wide measuring ranges and high precision over the entire measuring range
- More than 40 years of assay development expertise
- Premium quality of cobas analytical platforms with high safety and reliability standards
- Unique reagent concept with ready-to-use, failsafe & convenient e-packs for consistent results across all analytical platforms

Precise and reliable results
- High sensitivity in combination with a broad measuring range for safe and reliable results
- Robustness against interference (e.g. HAMA) due to a multi-dimensional approach: blocking proteins, fragmented catcher or tracer antibodies or chimeric antibodies
- High lot-to-lot stability for accurate long-term monitoring
- Consistently precise results across the platforms based on common technologies and low system immanent variability

High workflow efficiency
- Comprehensive assay menu including innovative markers
- Outstanding serum work area consolidation power with more than 200 parameters
- Broad system platform portfolio for every lab size with standardized reagents across the platforms
- Broad system platform offering for every lab size with consistent patient results
ECL and Elecsys®
Setting the standards in immunochemistry

Proven track record 1996 – 2011
15 years of excellence with 30,000 systems

Reagent and system competence
96 high-quality assays since 1996

The power of ECL technology
Enabling high-quality immunoassays for reliable patient results
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