

HORIBA ABX at the Heart of Medical Diagnostics

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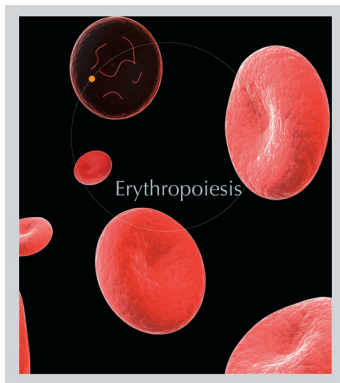


Figure 1 Erythropoiesis

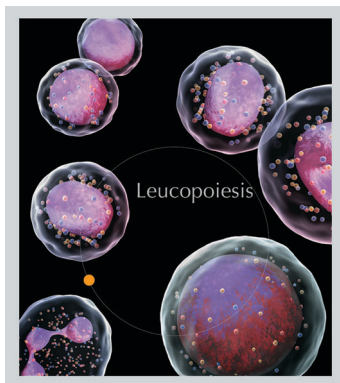


Figure 2 Leucopoiesis

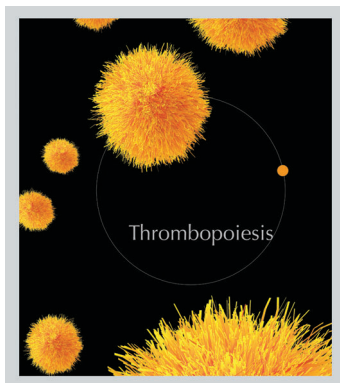


Figure 3 Thrombopoiesis

Nature Autonomous

Human beings and other animals maintain life through the mechanism and functions of absorption, resolution, and metabolism, taking place in the cells and organs of their own bodies. The body also has natural mechanisms and functions for healing injuries and eliminating foreign bodies. It can therefore maintain, protect, and cure itself. To keep these mechanisms and functions working properly, the body needs an adequate volume of a number of certain substances. Any deviation from this ideal, such as that induced by viral and bacterial diseases, leads to health impairment. Immune-defense system reactions to antigens generate antibodies in the organism.

Since blood contains various types of cells, substances and chemical elements, and flows throughout the body, we use blood diagnostics equipment to obtain information for diagnosis of a state of health or disease. Blood contains liquid plasma and blood cells. The blood is composed of 55 - 60% plasma, 40 - 45% red blood cells (RBCs, erythrocytes : Figure 1), and about 1% white blood cells (WBCs, leukocytes : Figure 2) and platelets (PLTs, thrombocytes : Figure 3).

About 90% of plasma is water and liquefied proteins (albumin, globulin, etc), glucose, fatty substances, natrium (sodium), kalium (potassium), calcium, phosphorus, and hormones. There are also antibodies generated by the body's immune system. The volume of substances liquefied in plasma and urine is diagnosed using various metrological methods, such as colorimetry, based on chemical reactions using reagents which react chemically to specific target substances.

Blood cells have different functions. The main function of RBCs is to transport oxygen throughout the body using the red pigment called hemoglobin. WBCs play a major part in immune-defense mechanisms to protect the body from foreign substances. WBCs are characteristically differentiated into several kinds of cells. PLTs attach themselves to injured

blood vessels. A blood count for each of these constituents provides us with important information on the physical condition of the body, and helps diagnose pathologies. RBCs, WBCs, and PLTs are differentiated by size and structure of cell particles. WBCs are differentiated by size, concentration, and type of cells. That reference technologies used to analyze the number and sizes of cells or other metabolic parameters are electrical impedance, flow-cytometry, and cytochemistry.

With the technical innovation of microsensing technology and software to enhance CPU-imaging data management, in-vivo diagnostics devices are growing rapidly in industrialized countries. They are mainly linked to image analysis, such as CT scans, MRI, and Ultrasonic imaging, which can provide diagnoses directly in the living body. At the same time, there is still a strong demand for greater accuracy, sensitivity, stability, and rapid analysis using in-vitro diagnostics devices (test-tube samples). The global market for in-vitro diagnostics recorded overall turnover of € 25 billion in 2003: 7% in hematology, 35% in clinical chemistry, 28% in immunochemistry, and 30% in other diagnoses such as infectious diseases.

HORIBA ABX: 20 Years of Hematology Expertise

ABX was founded in August 1983 with the following objectives:

- to design user-friendly analyzers with reduced maintenance;
- to apply industrial standards to instrument production;
- to offer products suitable for all types and sizes of laboratory worldwide.

ABX's first blood cell analyzer, the MINOS, with WBC 3-part differentiation functions, was an immediate success, not only in the French market but also worldwide. HORIBA, Ltd. began to distribute ABX products in Japan in November 1987.

During the 1990 s, ABX successfully launched 5 DIFF automatic systems, as well as Micros (Figure 4), a small instrument which has recorded more than 20,000 sales to date — a considerable performance on the In-Vitro Diagnostics (IVD) market.

Since 1996, HORIBA ABX has developed and launched four ranges of 5-diff analyzers, always integrating new technology, such as devices for performing reticulocyte and NRBC (Nucleated erythrocyte) counts, NRBCs and reticulocytes being RBC precursor cells. HORIBA ABX has also developed the first automatic system with fully integrated slide maker, coupled to the high range 5-diff analyzer. HORIBA ABX and HORIBA jointly developed and launched a unique hybrid analyzer of 3-part diff hematology and immunochemistry, using original technologies from both



Figure 4 Micros 60



Figure 5 Micros CRP



Figure 6 Pentra 400

HORIBA and HORIBA ABX. This analyzer, the Micros CRP (Figure 5), provides physicians with an analysis of patients' infectious diseases, along with the results of the hematology diagnosis.

New Prospects in Clinical Chemistry

The other major business sector in which HORIBA ABX has invested over the past few years is clinical chemistry diagnostics. In late 1998, HORIBA ABX purchased a range of clinical chemistry products and its European customer base from F.Hoffman-La-Roche. Meanwhile, HORIBA ABX was providing customers with technical support, as well as reagents and consumables, to ensure that their systems run properly. In 2000, HORIBA ABX developed and launched its own line of reagents, with better quality and performance.

This experience helped HORIBA ABX to understand customers' needs and expectations, and to design a completely new kind of clinical chemistry system: the Pentra 400 (Figure 6).

The Pentra 400, officially launched in February 2004, is a random-access benchtop analyzer with high productivity, extensive analytical capabilities, and unique flexibility for this range.

The Pentra 400 was also developed in association with several of the Group's companies, to make use of their unique expertise. In this way, HORIBA, a worldwide leader in analytical technologies, co-developed the Pentra 400 ISE module, and the Pentra 400 Optical System was co-developed by Jobin Yvon, a French subsidiary of HORIBA, Ltd. and a pioneer and worldwide leader in optical spectroscopy-related technologies. Because of this exemplary partnership, the Pentra 400 combines some of the best technologies in the world.

In 2004, HORIBA ABX will market the Pentra 400 in Europe and in some export countries only. But the Pentra 400 will soon be available all over the world and we are developing some major prospects to improve our turnover in the years to come.

Conclusion

Faster results, high precision and sensitivity, completely safe systems, and greater flexibility combined with cost control are major demands in today's medical diagnostics market. HORIBA ABX meets these requirements in three essential ways: producing reliable and intuitive analyzers, improving reference technologies, and remaining aware of innovative technologies.

People in HORIBA ABX are well aware of these challenges and pay close attention to the demands of customers and the market. HORIBA ABX is still a young company; the experience of HORIBA/HORIBA ABX in medical diagnostics is much shorter than our competitors. However, our people are willing to develop their competencies up to the highest level in order to provide diagnostic solutions to customers. Given the wide range and high level of technologies available in the HORIBA group and the enthusiasm of our people, HORIBA ABX will doubtless continue to develop unique and advanced products for the market.



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