



## MOLECULAR SOLUTIONS

# HUNTING FOR NEW APPLICATIONS

In response to the constraints of the traditional pharmaceuticals market, SBU<sup>(1)</sup> Molecular Solutions is developing new outlets. It is keen to use its know-how in peptide and oligonucleotide assembly to serve new applications. First markets identified: biosensors and cell culture.

**F**ounded in 2005, SBU Molecular Solutions (180 persons) consists of the subsidiary Girindus (82% Solvay) with two sites, one in Bensberg in Germany and one in Cincinnati (Ohio, USA), the company Peptisyntha (100% Solvay) based in Brussels and in Torrance (California, USA), and the fine chemicals plant at Salin-de-Giraud (France).

The SBU's core business is developing peptide and oligonucleotide-based molecules for customers, generally from the pharmaceutical sector. These active pharmaceutical ingredients (APIs) are composed of

peptides (Peptisyntha) or oligonucleotides (Girindus).

### AMBITIOUS REFOCUSING TO 'DE-RISK' THE BUSINESS

On a global level, the SBU is currently the only player on the market to offer its expertise both in peptides and oligonucleotides. The SBU has already started exploring adjacent businesses (biosciences in general) based on its technological leadership in the assembly of peptides and oligonucleotides, which are families of polymers known under the common "tides" name.

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Today's pharmaceutical industry faces extremely strict regulatory and validation procedures. To qualify, the new drugs whose clinical journeys our customers are managing must meet highly demanding toxicity and efficacy criteria.

"We have no direct lever on the success of the molecules we develop for our pharmaceutical customers", explains Dr. Jean Fabre, Chief Scientific Officer of the SBU. "Statistically, for every molecule that reaches the market, you have to launch about 7 500 molecules at the preclinical stage. In addition, it takes 8 to 12 years to develop a drug, leaving a successful manufacturer just eight years to exploit it before the molecule falls into the public domain and into competition with generics."

SBU Molecular Solutions has therefore decided to develop a business strand to complement its API activity, and balance out the risk inherent in this market.

## NEW PROSPECTS

"First strategic focus: new materials", says SBU Manager Dr. Ern Edmonds. Initially this is the market for cell culture ('ex vivo' culture of cells outside the organism). Today, 60% of vaccines, enzyme or other, are produced by fermentation using cell culture. The total market is estimated at around EUR 49 billion a year.

"We want to exploit the ability of peptides to form a reversible hydrogel in aqueous medium (see box) and their unique properties for cell proliferation, in order to introduce this material into the cell culture industry." Peptides could bring a real difference in terms of cost, ease of handling and time saving.

Second focus: new applications for our innovative materials in the biosensors market. This is based on the use of enzymes, which are in

fact nothing more than long peptides, which catalyse highly specific chemical reactions. Did you ever wonder how, inside your body, all these chemical reactions could take place at 37°C, while the same reactions in the environment, reproduced in chemistry labs, require much higher temperatures? This is because reactions within an organism are facilitated by enzymes, which are biological catalysts. If we combine the chemical catalyst property of an enzyme with an electronic circuit to 'translate' the chemical reaction into an electrical signal, we then have a biologically-based sensor (biosensor), characterized by a very high specificity.

To take one example: blood testing to monitor cholesterol levels currently requires sophisticated equipment. Using an electrochemical detector or an enzyme, associated with an electronic element, would enable the analysis to be done directly in the doctor's surgery, with immediate results!

This technology is potentially applicable to all molecules that blood tests serve to track down, with a significant reduction in medical costs.

## AN INFINITE FIELD OF APPLICATIONS

An almost infinite field of applications opens up for these new molecule uses: "The security market, for example, could constitute a broad applications area, with ex vivo detection of target molecules using an extremely sensitive and specific system based on enzymes", says Jean Fabre. "Right now, security services have

only dogs to detect explosives or drugs; in fact it is the animals' enzyme systems that give them this capacity! The same technology could be used to passively monitor people's health in their homes, or with 'smart tags' placed in clothes to monitor vital parameters

(pulsation, oxygen level, blood pressure...) or diseases for which they are programmed", says Ern Edmonds.

The SBU's ambition is clear: to double its turnover by 2018, by increasing partnerships and government funding.

Peptide chemistry specialist Dr. Mimoun Ayoub recently joined the SBU and is working full-time on its strategic development: "Our current business is exposed to several risks: clinical studies, the financial health of our customers, competition from Asian countries, etc. The growth we seek cannot come only from our service provider activity. We want to transform ourselves into a solutions provider in biosciences, based on know-how developed both in-house and in collaboration with researchers around the world." ●

(1) Strategic Business Unit.

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## The egg in the pan

When you break an egg into a frying pan, the gel surrounding the yolk is transparent. Under the effect of heat, it whitens. Irreversibly. Hydrogel, on the contrary, can undergo a reversible phenomenon. Depending on the temperature or the acidity of the medium, a peptide with a specifically composed sequence can go from gel to liquid and back again.