Interview: Patrick Bourdet â?? President and CEO, AREVA Med, France

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The president and CEO of AREVA Med, the medical subsidiary of AREVA Group, the biggest nuclear company in the world, discusses the circumstances that inspired AREVAâ??s foray into nuclear medicine, one of the most interesting new fields in medicine today. He outlines his companyâ??s philosophy of simplicity and excellence, his plans for international expansion and his strategy for keeping AREVA Med in the lead even with the entrance of Big Pharma players in this field.

After a long career in the nuclear industry, in April 2009, you were appointed President and CEO of AREVA Med. What was the vision behind the establishment of AREVA Med?

The entire project began with an idea I explored during my masterâ??s degree, which was sponsored by AREVA. As part of my degree program, I studied the topics highlighted by AREVA. I decided to choose the topic of â??innovationâ?• as the focus of my masterâ??s thesis, and I discussed seven ideas. The first was the extraction of a rare metal (lead-212 or ^{212}Pb) for cancer treatment. At this point, it was still very much just an undeveloped idea. In 2005, at the global AREVA contest for innovation, out of 220 global ideas, this idea became one of the six recognized by the then AREVA CEO.

The nuclear industry, just like any other industry, has experienced a great evolution in the past three decades. There are many common core competences in both the nuclear science and pharmaceutical industries â?? there are a surprising number of synergies, which explains why the creation of AREVA Med was a logical step. AREVA Med was founded on the historical competences of AREVA Group. With AREVA, we have the benefit of four core competences of AREVA Group: design of nuclear infrastructure/facilities, radiochemistry, logistics and nuclear measurements. Based on this, we have a very strong base to innovate in medicine. It is true that AREVA Med is nothing like AREVAâ??s core business, which is why what we are doing is â??disruptiveâ?? innovation. But we are applying the same core principles, just to a completely different field.

What have been some of the key milestones for the business these last few years?

The company has grown very organically and promisingly over the past decade or so, on both sides of the Atlantic. After the idea was recognized in 2005 at the internal AREVA competition, we received the first funding from AREVA Group in 2006. In 2008, we created a partnership with the US *National Cancer Institute* (NCI). A year later, we created the company AREVA Med. In 2011, we acquired Macrocyclics, the global leader in ligands and chelation, to take our development to the next level. In 2012 we initiated the first Phase 1 clinical trial with ^{212}Pb and completed patient enrolment last year. Also in 2012, we signed a long-term and global partnership agreement with Roche, which we are very excited about. Now we have a very strong company staffed with the best and the brightest, and we see a very promising future ahead.

Nuclear medicine is very much a nascent field. Could you tell us a bit more about your business model?

One of the most interesting aspects of this field is the relationship to risk. When we started, no one else was doing what we did and the field of nuclear science was completely different. We would like to combat the paradigm of complexity that persists in the industry, and thus our main motivation was to make things as simple as possible.

When you deal with simplicity, you are immediately adding robustness to the process. If it is simple, it is also likely to be cost-effective, and therefore compatible with the commercial goal of obtaining reimbursement through health care systems. The proprietary technology we have developed is so simple and easy that when it is presented to our partners, they are amazed. As a symbolic basic example, our production process also uses water. It does not get much simpler than that.

We extract and produce ^{212}Pb from a proprietary source of natural nuclear material. We need two-billionth of a gram to treat each patient. The entire capacity of our production facility, the â??Laboratoire Maurice Tubianaâ?• is only 300 micrograms in its total lifetime â?? but this is enough for hundreds of patients. The preparation of the medicine is fairly straightforward. We provide our proprietary automated device, there is a touchscreen on it, you plug in a generator containing ^{212}Pb and push a button to recover high purity ^{212}Pb thirty minutes later. This ^{212}Pb is then ready to be compounded to biological vectors targeting cancer cells. Treatments with ^{212}Pb can be highly targeted while limiting impact to nearby healthy cells. In our first Phase 1 clinical trial, the patients were able to leave the hospital four hours after injection. This revolutionizes cancer treatment while minimizing risks to the hospital staff and health practitioners, and the need for specialized equipment.

To produce the high-purity ^{212}Pb needed for clinical development, in 2013 AREVA Med built a unique facility in France, the Laboratoire Maurice Tubiana, with a second facility in Dallas, in the US under construction since September 2015. How have these facilities allowed you to take the development of new treatments in nuclear medicine to the next level?

Our philosophy of simplicity is also key regarding the choice of our site locations and every aspect of the construction and design of our facilities. The Maurice Tubiana facility itself is located on an historical AREVA site, so we were familiar with it and knew it met our requirements. We chose France for several reasons: the robust infrastructure, the tradition of medical excellence and the culture of academic and research competency. We have a first-class infrastructure covering 100 percent of the country, and most importantly, we have a revolutionary spirit that drives our creativity and innovation. People in this country have a unique ability to generate ideas that to push the limits of what is typically allowed.

As for the US, there were three main reasons. Firstly, the US is undoubtedly the biggest and best oncology market globally. We had the choice of starting clinical trials in a different region, where it would likely be faster and easier, but we decided that it would make more sense to start in the toughest market first, because it paves the way for all the other markets. Secondly, the US simply has much more resources to offer. The National Cancer Institute in the US has USD 3 billion in funding, which is more than what France allocates to public research in total â?? INSERM has a budget of EUR 650 million (USD 710 million) for all pathologies. This compensates for the more stringent regulatory environment. Finally as we are also aiming for cost-effectiveness and preparing for our global expansion plans, having a domestic distribution platform in the US will reduce our shipping costs . Our facility in France will supply Europe while our facility in the US will supply the Americas.

As for the choice of Dallas, it is geologically very stable (except for the occasional tornado!) and all of the US can be reached within a five-hour flight. Macrocyclics, our subsidiary, was based there as well, so the transition will be very simple. In the long-term, we plan on building more â??*Domestic Distribution and Purification Units*â?• in other parts of the world.

Nuclear medicine has recently seen some new players, particularly Big Pharma companies. How can AREVA Med differentiate itself from these new entrants and continue to lead the industry?

We follow a very simple principle: we work only with the best. Working with only the best maximizes our chances of success. This is the driving principle behind our activities. Our technology has three components: a vector, our ^{212}Pb compound, which kills the cancer cell, and a chelate to bind the first two components. First, we acquired Macrocyclics, which is the best company in the world in chelation. Then we developed this partnership with Roche, the number one company in terms of oncology vectors. AREVA Med is the best company for ^{212}Pb. We are constructing an unbeatable entity.

We take a similar approach to our recruitment process. We are very slow to recruit because we only accept the very best, whether they are molecular biologists or engineers or business managers. As a result, we have built a very strong team and our staff turnover is very low; only one person has left so far. Our people are with us because they personally believe in our vision, our technology and its potential to improve medical outcomes for patients.

Given that many Big Pharma companies are now entering the field of nuclear medicine, as a subsidiary of a non-pharma company, what opportunities and challenges does AREVA Med anticipate?

It may seem an obvious next step for us to move to a pharma company now that the nuclear medicine sector is developing quickly. However, what is important is not merely whether a company is positioned within pharmaceuticals, but whether the company has the resources and characteristics to fully support AREVA Medâ??s growth. Without AREVA Group, we would not even be here. They have invested an significant amount of money and resources in us, and we are very grateful. Furthermore, so far we have been very successful. We have had independent strategic analyses done and the conclusion is that there is huge amount of potential for AREVA Med, and the expected returns, from both healthcare and financial standpoints, are immense.

As AREVA Med, we have many advantages. There are only a limited number of isotopes suitable for nuclear medicine and ^{212}Pb is one of the main ones. As it is a natural compound, supply â?? and having a reliable supply â?? is critical to the business. Due to AREVAâ??s traditional activities in nuclear technology, we have a very reliable supply and we do not have to face the main threat of

shortages. This is a huge benefit for us as a company in nuclear medicine. We have a very clear global strategy for AREVA Med., We do not think it is necessary for us to join a traditional pharma company. Big companies are entering nuclear medicine because it is a sector with huge potential. The number of patients required to achieve market approval for a nuclear compound can be very low; with just 400 patients, a product could possibly go on the market.

In March 2015, AREVA Med was awarded the CEO Cancer Gold Standard Accreditation. Chris Viehbacher, as chairman, said that this certification acknowledges the personal leadership of your work as CEO of AREVA Med. How would you describe your personal leadership qualities?

We are taking natural material and making it an efficient anti-cancer treatment. The technical complexity of what we do is significant and our goal is to simplify everything. As a non-scientific person, it is very important for me to be receptive and to listen to what the experts around me are saying. If I always simply insist on doing everything my way, this company would have failed a long time ago. Given that we have assembled such a competent and brilliant team, as the CEO, I need to take advantage of their collective intelligence, particularly on technical and scientific matters, when I make decisions. This is what I call influential management.

What would be your last few words on AREVA Med?

Start looking at what we are doing. It may revolutionize the way we develop therapies for some critical pathologies. Do not underestimate Franceâ??s capacity to realize this potential. This country will bring real revolution in the next ten years. The development in France is slow â?? we are slow to start compared to the US, but once we start, we achieve great things. France has huge potential. Change is coming! Slowly, but surely.

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