Nr 5 | MARS 2014

MEDIA PLANET

Life Science

Featuring

BIG SCIENCE
Sweden is at the forefront of scientific accomplishments

DISEASE PREVENTION
Development and accessibility of vaccines is crucial to the third world

REVOLUTIONARY TREATMENT
New techniques are changing the healthcare landscape

At the frontline of medicine

Dr. Robert S. Langer: It will be imperative that researchers and practitioners around the world collaborate and share information through scientific networks

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PHOTO: MIT

CHALLENGES

Almost 40 years ago, as a very young project manager at American Home Products, I was approached by the President of my division who told me to go to Sweden and find out if we could buy this company called Pharmacia...

Exporting the 'Swedish Advantage'

Barbro C Ehnbom
Chairman, Swedish-American Life Science Summit.
FOTO: CATHARINA ÅSTRÖM

This shining star of a Company was productively spending much more on R&D than anyone in America and put Sweden on the map as an exciting home for Life Science Discovery. Astra was already well respected and Karolinska, although not well known in the US at the time, was an untapped resource that since turned out to produce important research scientists and technologies.

Fast-forwarding to the early 2000's, Life Science had become a booming industry for Sweden. Here in NYC, the Swedish Consul General showcased hot new biotech companies; exciting new technologies from the "old country" that seemed to open new opportunities in America, the largest market in the world.

Global growth

The trend in the Life Science industry however, was increasingly growing globally, with several of the emerging markets becoming quite competitive; China was becoming a huge market as well as India, who also became a thriving manufacturer and a major player in the outsourcing of drug discovery; Indonesia and Singapore also grew in world-wide importance. The financial crisis in 2008 with its financial effect, particularly on the overall US economy. This further changed the scenario and the pattern of the global life science industry. Today, in order to develop into a successful company, one must have a global network in place.

Nurse the new technologies

Since the void created by the Astra Zeneca departure from the Swedish Life Science landscape, several notable initiatives have been launched, like SciLifeLab, Vetenskapsstaden, Forte and others, to ensure the continuation of solid basic research in Sweden. The real jeopardy appears to be the lack of funding of early stage companies.

The private venture capital industry has cut back drastically or at least seems to only invest in later development stages. Vinnova is doing a great job from the government side, but much more is needed to nurse new technologies and innovation to bear fruit in actual sales. Access to big pharma is also essential for worldwide alliances for striving Swedish entities. As most major pharmaceutical companies today foster in-house incubators, Sweden could offer them financial tax-incentives or other programs in order to have them locate to Sweden. This could then re-align big corporate connections and may also attract sharp scientific minds and entrepreneurs to come to Sweden enhancing our intellectual capital.

A vital factor

Having seen so many Swedish Life Science companies and cutting edge rising stars present during our ten year existence of Swedish American Life Science Summit (SALSS), perhaps one might consider bringing in CEOs from outside Sweden. This could accomplish immediate access to international networks and, most likely, also improve salesmanship.

No matter how outstanding research and innovation a company possesses, developing and selling the product is still a vital factor for accomplishing set goals and achieving its missions while exporting the "Swedish Advantage".

FACTS

SALSS 2014 is the ten year jubilee of a series of Summits focused on the Swedish-American exchange within the field of Life Science. An exclusive by - invitation- only event, SALSS has over the years hosted Nobel laureates, Wall Street legends, policymakers and _CEOs of big pharma companies. Catering to both Academia and the financial sector, the Summit has taken on the character of a think tank for the industry, which made the Institutional Investor proclaim Stockholm and SALSS as one of the world's business hubs for Life Science. For the ten year anniversary of the Summit, the theme will be the Future of Medicine.

Fabian Lindgren
Project Manager, Life Science
PHOTO: MARTIN BJÖRINGE

It has been a pleasure to create this campaign, with thorough talks about everything from biosciences to regenerative medicine, I have truly learned the importance of the continuous development of Life Science.

I hope you will too!

Read more on the webb!
www.forskningsverige.nu

MEDIA PLANET
Vi får våra läsare att lyckas!

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Citera oss gärna, men ange källan.

NEWS

Being involved in and watching the progression of biosciences, I coined the following: "Most people don't give a damn about life sciences until their last ten days on earth."

AN OUTSIDER'S VIEW OF

SWEDISH BIOSCIENCE, HEALTH AND ECONOMICS

ECONOMICS

Think about it, what do you do to enhance your own health on a daily basis? Or, how do you assist the progression of biosciences in society? Do you support the teaching of science and health in your schools? Do you support the scientific research through financial support of an association, university or company, as a shareholder? Are you taking care of yourself? Yet when confronted with the eventual outcome... incapacitation and death, we often look for the "miracle".

Preventive vaccines

Often those miracles are the result of applications of science resulting in pharmaceuticals, therapies or surgery. Others call for a preemption of disease through proper health practices. One only needs to look at what sanitation and enhanced public health through preventative vaccines has done. Another excellent example of a direction that should be taken can be found in the following publication of the Swedish National Institute of Public Health's Physical Activity in the Prevention and Treatment of Disease.

Charles F. Ferris
Ph.D.
President/Founder
STRATEGIC SCIENCE LLC

A worldwide role

HEALTH problems are global, and exist in both developed and emerging countries. Professor Hans Rosling vividly portrays the positive and negative aspects of the interrelationships of health and economic growth. Given that health affects both national expenditures and economic development, there needs to be a new paradigm. The new paradigm should posit: strategically, biosciences, its research, development and applications, and the health of a nation's citizens need to be inexorably integrated resulting in increased health and quality of life, decreased health care expenditures and increased economic productivity.

Sweden has taken a prominent worldwide role in many areas including neuroscience, stem cell and regenerative research, molecular biology, proteomics and physiology. The above mentioned Swedish National Institute of Public Health's publication demonstrates the potential of transitioning research to adaptation to improve health outcomes.

HEALTH problems are global, and exist in both developed and emerging countries.

"Big Science"

Importantly, Dr. **Stefan Larsson** of the Boston Consulting Group in Stockholm has teamed with **Michael Porter**, a renowned professor of strategy at Harvard University, to advance BCG's value-based health care collaborative, the International Consortium for Health Outcomes Measurement (ICHOM). Further, one cannot forget that Sweden is at the forefront of scientific accomplishments and understanding; otherwise, it would not be able to assess scientific research to properly confer Nobel Prizes. These components are the foundations of what is being described as "Big Science and Big Data".

Economic strength

Sweden is in a unique position of having the ability to capitalize on its scientific foundations, producing, collaborating and integrating the exponential growth of bioscience, and when correlated to distinctive outcomes through ICHOM has the potential to allow Sweden to strategically ratchet up "Big Science and Big Data" in health care. As Sweden's citizens, or for that matter any country's citizens, take advantage of the "Big Science and Big Data" applications that are coming, there will be a concomitant enhancement of bioscience and health that will importantly result in wellness, overall quality of life, productivity and economic strength.

CHARLES FERRIS
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NYHETER

Regenerative medicine allows the body to rebuild itself and offers huge potential for a wide variety of patients that is only set to increase as new advances go mainstream, Sean Hargrave discovers.

REGENERATION MOVES FROM LAB TO PATIENT

MEDICINE

TISSUE

The ability to grow new tissue to order is going to have a major impact on future healthcare provision. If technology carries on being successfully rolled out it is not hard to imagine a future where a patient requiring a new organ simply has one grown in the laboratory from their own cells. Any tissue that needs to be replaced, due to disease or injury, can similarly be harvested from a small collection of cells, grown in a petri dish and then placed inside the body by a skilled surgeon.

A revolutionary treatment

Certainly Dr Robert Langer, Professor at the David H Koch Institute at the prestigious Massachusetts Institute of Technology (MIT), believes we are entering a golden era where decades of painstaking research are now starting to change healthcare for the better.

"The technology is already transforming the lives of people who have suffered burns," he says.

"I wouldn't say it's routine yet but taking some skin cells from a burns victim and growing large patches of skin to replace their damaged tissue is now pretty well established as a viable treatment. You only have to imagine yourself in the burns victim's position to appreciate how revolutionary the treatment is because without new skin they could die. It's also greatly helping people living with diabetes who are prone to skin ulcers which can be treated with new skin grown from their own cells."

The technology is already transforming the lives of people who have suffered burns.

New treatments

Although skin is arguably the most widespread application for the new technique, new regenerative treatments are now starting to move beyond the experimental stage to be successfully applied to patients. These tend to be focused on bone and cartilage, although have also seen huge advances in other areas.

"We've had a lot of success with bone and cartilage because, although it's not easy to grow, it's easier than some other tissue types," says Dr Langer.

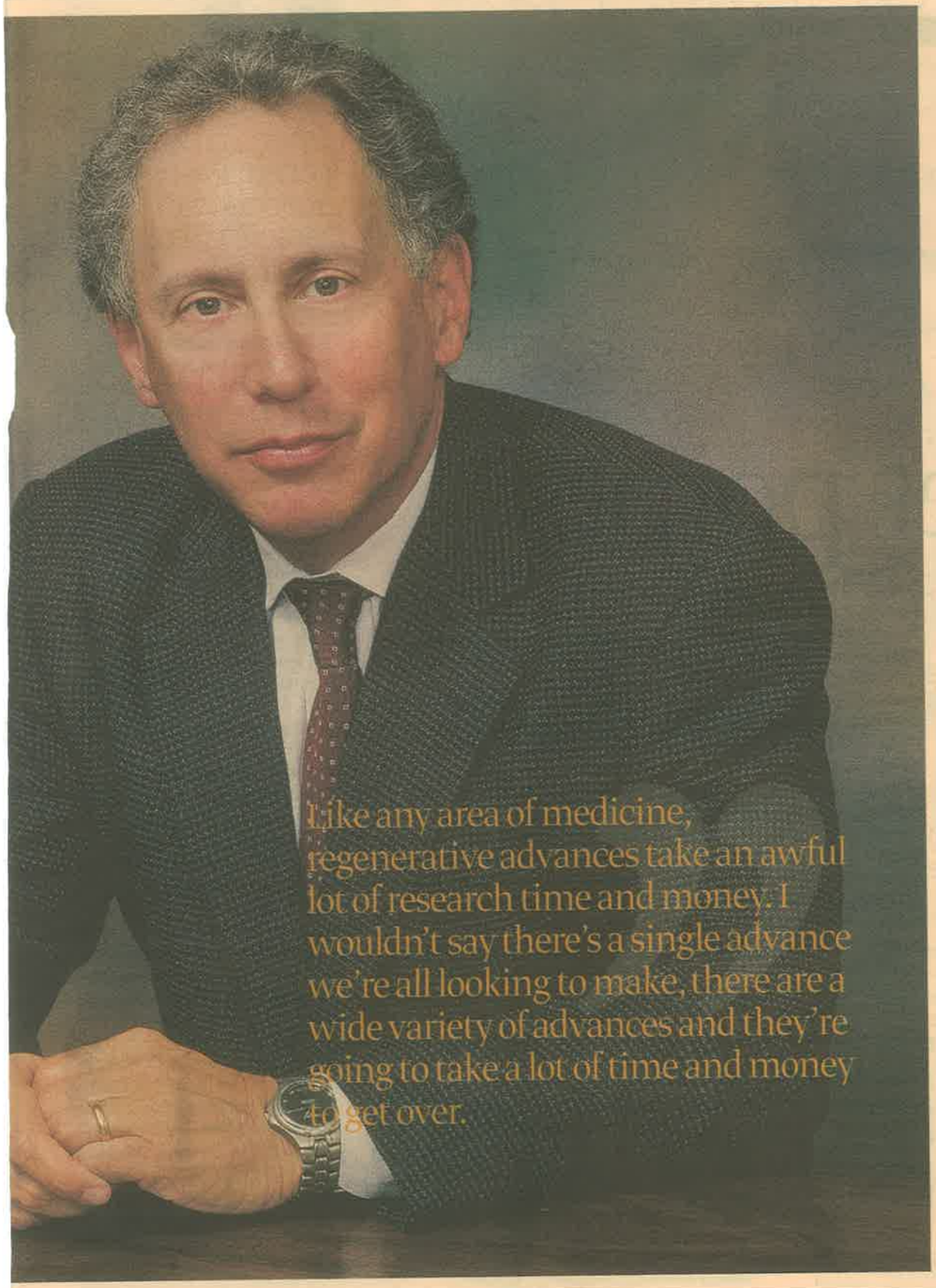
"I was recently part of a team that was able to build a young boy a replacement for a part of his rib cage that was missing. It was crucial he had the new bone material because his heart wasn't protected. There's a lot of successful work with bone and cartilage for helping people who've been in accidents and, in particular, soldiers wounded in the line of duty, and so are missing bone material. There's also been some very interesting work in replacing tracheas in Sweden."

You only have to imagine yourself in the burns victim's position to appreciate how revolutionary the treatment is because without new skin they could die.

Techniques can vary to grow new material but are generally based around taking a sample of material from the patient and then placing these cells within a polymer scaffold for the new tissue to grow around. This ensures it ends up the correct size and shape and also helps train the new cells to grow in the desired direction, rather like trailing beans or roses along a pole or piece of gardening wire.

Harvesting cells

A chemical needs to be added to the tissue to prompt the cells to start diving to generate new tissue. Stem cells are sometimes used in the process but Dr Langer concentrates on harvesting cells from the part of the body which needs to be regenerated rather than starting off with stem cells which have yet to turn in to a particular type of tissue.



> We've had a lot of success with bone and cartilage because, although it's not easy to grow, it's easier than some other tissue types.
>
> **Robert Langer**

▸▸▸ Not every part of the body has so far been impacted by the latest advances in regenerative medicine because some tissues types are more straightforward to build than others.

"It's a lot easier to build structural tissue than it is tissue which carries out a complex task," explains Dr Langer.

"Tracheas, cartilage, bone and blood vessels are simply structural, they don't carry out complex tasks so they can be regrown a lot more easily than tissue for more complex organs. The brain will obviously be the hardest to build because it's made of spongy material which contains so many different cell types that are responsible for very complex reactions. So, while we make a lot of progress with structural tissue types, it will be complex organs where we will then have to make the next leaps forward."

Time and money

For these next advances to be made successfully, Dr Langer reveals it will be imperative that researchers and practitioners around the world collaborate and share information through scientific networks, dedicated to supporting regenerative medicine. However, ultimately the big challenges in science come down to pioneering research work and for this to take place across the globe, it will require significant funding.

> It's a lot easier to build structural tissue than it is tissue which carries out a complex task.

Regenerative advances

"The big challenges going forwards are going to be the same as today," he says.

"Like any area of medicine, regenerative advances take an awful lot of research time and money. I wouldn't say there's a single advance we're all looking to make, there are a wide variety of advances and they're going to take a lot of time and money to get over. Like any area of science, the budgets are not always forthcoming, so that's arguably the biggest challenge everyone faces."

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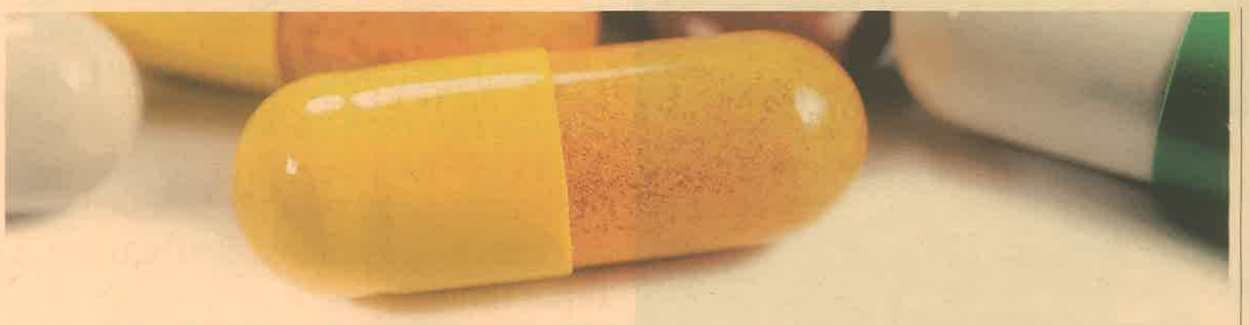


A few bullet points

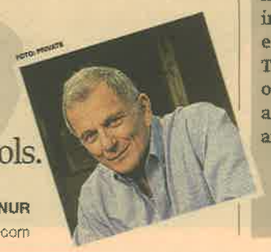
What is happening in the Pharma industry and how can Sweden can play a bigger role in this sector?

- The global Pharma industry today is under financial and innovation pressure.
- Profitability (EBTA) is on decline despite the current surge in the public market for Pharma business.
- Top selling drugs are facing generic competition.
- Large Pharma companies have only a limited number of potential blockbusters in their pipeline In the emerging markets where the growth is still sustainable beyond short term public market bubbles, pricing is an increasing issue.
- Big Pharma are also facing shrinking reimbursements in the "old markets" (US and EU) as well as in other markets.
- The public perception of the Pharma industry being "rich" enhances governments and public pressures for cost cutting and cost containment
- Big Pharma companies are also facing a patent-cliff where for many top sellers exclusivity is being lost.
- Another internal crisis for the big Pharma is the innovation crisis. Addressing the remaining unmet needs and diseases that have no current medical solutions is very challenging (and costly) as these needs are in complex diseases. A Staggering number of clinical trials are failing to show efficacy and the cost of conducting them is skyrocketing. It is estimated that today, the cost to bring a new drug from concept to market is in the several billion dollars.
- Compounding on this is the internal R&D inefficiencies inside these large corporations.
- This squeeze requires a change of business models, from selling a pill to providing a full disease management solution. This change need to be adopted by large, medium and smaller Pharma companies.
- New financing models are being created to address these changes, including the increasing involvement of "social investors" in the Pharma industry.

Sweden is in a unique position to benefit out of this Pharma squeeze if:

- Maintain the innovation pipeline inside Sweden by providing government incentives to entrepreneurs and creating incubators/accelerators to ensure capital efficient R&D.
- Build alternative financing to replace the failing venture capital industry.
- Shift the focus from the traditional markets to the emerging markets, addressing the unmet needs there. Create JVs with the emerging markets distribution pipelines.
- Expending into rare diseases and orphan drugs.
- Build specialization in sub sectors of the value chain and focus on them.
- Address disease management as a package
- Encourage innovations in cutting edge technologies like stem cell therapies, genomic and personalized medicine via long range strategic plan
- Investments in relevant academic education and encouraged the young generation to go to biosciences, not to law schools
- Focus on capital efficient investments
- Life Science has become a global industry, maintaining and improving international connections are crucial.

Investments in relevant academic education and encouraged the young generation to go to biosciences, not to law schools.



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INFECTIONS

New rapid measurement of bacteria on surfaces to reduce hospital-acquired infections

Hospital-acquired infections affect more than 10 procent of indoor patients in most hospitals.

It results in huge costs for the health care system and considerable human suffering or even death. The bacteria are transmitted among patients, personnel and visitors, directly or indirectly. Results on numbers of bacteria by culture techniques require at least one day. A rapid assessment of the bacterial contamination of surfaces, medical devices and cleaning tools is likely to stimulate improvements in hospital hygiene.

Individually calibrated

Rapid techniques for measuring adenosine triphosphate, ATP, have been used to measure biological contamination in less than a minute. However, this technique neither differentiates between bacterial and human cells nor between living and dead cells. BioThema has developed the first test to specifically measure bacterial ATP on surfaces after degradation of non-bacterial ATP. Each test is individually calibrated to allow estimation of live bacterial cells. This test has been used on various surfaces, medical devices and cleaning tools in hospitals and in special care situations.

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