LUNDBECK MAGAZINE 2010

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AN ENORMOUS HEALTH CHALLENGE

The incidence of central nervous system disorders is on the rise. In 2030 depression, dementia and alcohol abuse are expected to be among the five diseases that cause the most years of healthy life lost in high-income countries[1].

Disorders of the central nervous system (CNS) reduce the quality of people's lives and have great societal costs. Indeed, CNS disorders already account for 35 percent of total direct and indirect health costs in Europe[2].

At the same time, less prevalent diseases such as schizophrenia, Parkinson's disease, Huntington's disease, epilepsy and infantile spasms remain extremely disabling for those who are affected by them. If this enormous health challenge is to be met successfully, there is a need for massive efforts to which everyone can and should contribute.

Research in the drugs of tomorrow is the cornerstone of Lundbeck's activities. CNS research is exceedingly complex, and we know that it takes many years for a discovery in a laboratory to become a new treatment for patients.

We have made it our ambition to be the company that makes the biggest difference for patients with CNS disorders. Shouldering this task is a huge responsibility, but it is also a huge joy when we succeed in developing a new and innovative drug that benefits people around the world.

Fifty years ago, Lundbeck launched its first CNS drug, Truxal®, for treatment of schizophrenia, and has since launched a number of innovative drugs for treatment of psychiatric disorders. During the past ten years, we have also been able to offer new possibilities of treatment to patients with the neurological disorders Alzheimer's disease and Parkinson's disease.

In 2009, we have had the pleasure of adding to our portfolio new drugs for treatment of Huntington's disease, epilepsy and infantile spasms. We have therefore chosen to focus on these diseases in this Lundbeck Magazine.

In the magazine, we present a snapshot of our world. I hope you will find it interesting, and that it will give you some insight into who we are and what we are endeavoring to do.

Ulf Wiinberg
President & CEO

1. Mathers & Loncar, *Projections of Global Mortality and Burden of Disease from 2002 to 2030*, 2006
2. European Brain Council, *Cost of Disorders of the Brain in Europe*, June 2005

A LIGHTHOUSE IN THE DARK

Everything seemed possible for the Douglases until Matt was unexpectedly diagnosed with Huntington's disease.

Matt and Karen Douglas were a young couple, busy building their careers and dreaming of their future. Karen worked in early education and Matt worked in sales. Both were dedicated to their church, and Matt controlled the soundboard to accompany the choir every Sunday. Everything seemed possible for them.

However, as Matt approached his 29th birthday, things began to change. Slowly at first, Matt began to notice changes in his muscles, and experienced erratic, jerky movements that he couldn't control. "It began with small motions," Matt remembers. "My hands would twitch when I didn't want them to, and I couldn't get them to stop."

At first they thought these movements might be associated with stress. Matt had recently been in the US Army, serving in Saudi Arabia after Desert Storm. The experience was intense and they thought that he might be experiencing physical symptoms of stress from the time he served there. They consulted with local doctors but none had a definitive answer for the family. Subsequently, they requested to see Dr. Amy Colcher, Clinical Associate Professor of Neurology at the University of Pennsylvania, who specializes in movement disorders.

Robbed of his youth

Uncertain as to the cause of his condition, Matt and Karen waited while Dr. Colcher ran a series of tests to assess Matt's hearing, eye movements, strength, coordination, mental abilities and DNA. The news was not good. Tests confirmed that Matt had Huntington's disease, a rare neurodegenerative disorder. The couple was told that the disease runs in families and that he must have other relatives with the condition. "Growing up, I had watched my mother suffer with moodiness and from movement that she couldn't control, but I didn't think that my symptoms were connected to hers," says Matt.

"We never talked about it in my family," he continues, "but I now believe that my grandfather also had Huntington's disease, and later on we learned that my mother and three of her siblings were afflicted." In contrast to his own experience, Matt's family members didn't show symptoms until they were in their late 50s. Because his family did not discuss the disorder openly, he was left largely unaware of the nature of the illness. "I guess I didn't think what I was experiencing was related because I was so young," says Matt. A disease that robs many people of their control, autonomy and dignity had also robbed Matt of his youth.

Difficult choices

Although the couple now had a name for Matt's condition, there was little solace in the answer. They began to worry how they would cope with their future. "The emotional aspect of accepting the diagnosis was difficult," says Karen. "We were beginning to realize how dramatically our lives were going to change."

After the involuntary movements, known as chorea, became more severe, Matt had to slow things down. "There were times when I just didn't feel like doing anything," says Matt. "Everything was so much effort and I became depressed and didn't want to leave the couch."

Matt's emotional changes were not just a reaction to his diagnosis. Huntington's disease can create difficulties in regulating emotions, and depression is a prominent symptom. "The man I married was active and outgoing, and it was very difficult to see his personality change and for him to become so guarded," Karen reflects. Reminiscing about their earlier days together, she says, "Some of our greatest memories are of the Maryland shore, taking walks and enjoying the freedom of the outdoors." Even these simple activities had become strenuous.

"The emotional aspect of accepting the diagnosis was difficult. We were beginning to realize how dramatically our lives were going to change."

Karen Douglas

"I didn't want to go out as much," says Matt. "I was embarrassed and fearful that I would break something or distract people with my body moving the way that it did."

Matt Douglas

As the disease progressed, the Douglases had to make some difficult choices. "The disease definitely forced us to change our long-term goals," says Karen. Now severely limited by his symptoms, Matt was unable to continue working. Karen also had to take a job that was more flexible to allow her to provide more care for Matt. They realized their dream of one day having children may not become a reality.

While Huntington's disease can affect areas of the brain that control cognition, emotion and movement, Matt was mainly stricken with the uncontrollable movements he experienced. "I didn't want to go out as much," says Matt. "I was embarrassed and fearful that I would break something or distract people with my body moving the way that it did."

Making life easier

Six years ago, Dr. Colcher told the Douglases about a clinical trial of a drug to help with the chorea that Matt was experiencing. "We feel we were fortunate to try the treatment at that time, because Matt was on a steep decline," says Karen. "It was getting harder and harder for him to do daily activities."

Within a few months of taking the medication, Matt's chorea lessened. "The medication doesn't stop the disease itself, but it allows me to keep life as normal as possible," says Matt. "It lets me hold on to the things I enjoy."

Along with medication, there are little things that help Matt and Karen through the day. They purchased a coffee maker with individual packets so Matt doesn't spill the grounds when making his morning cup of coffee. They bought a gas stove, so that Matt can see and smell when it's on, and they also purchased a bed with separate chambers so Matt's movements don't interfere with Karen's sleep. "They are little things," says Matt, "but they are meaningful."

While visits to the shore have become less frequent, the couple copes by bringing their love of the ocean into their home. Their house is decorated in a nautical theme, with several lighthouses in each room. "It relaxes us and reminds us of the day we were engaged at Tybee Lighthouse in Georgia," says Karen.

Openness leads to increased support

Unlike the older generations in Matt's family who either didn't know or didn't disclose what they were enduring, Karen and Matt have chosen to share their story with others. "As soon as we found out that I had Huntington's disease, I wanted to make sure we talked about it," says Matt. Realizing that not talking about the disease contributed to the destructive impact the disease had on Matt's family, the couple has been vocal with family and friends about Huntington's disease and resolute in their desire to make the best of things.

Matt and Karen take every opportunity to share their experience of living with Huntington's disease, and have found it has led to increased support from family, friends and in the community where they live. Though Huntington's disease might aggressively steal Matt's independence, the Douglases vow not to let it steal their voice.

While they don't currently show any symptoms, Matt's brother prefers not to be tested and his sister is not sure if she wants to see if she also carries the gene. This is not uncommon in families with Huntington's disease since children of an afflicted person have a 50 percent chance of inheriting the disease. Many people simply want to continue to live a normal life for as long as possible without the dread the diagnosis can bring. Since the disease impacts the entire family, when Matt's sister was married, they spoke candidly about the disease with her husband.

Matt and Karen hope their openness will encourage others to seek medical resources, and perhaps even help find a cure. "It's all about choices," says Karen. "We choose to educate people about the disease, we choose to love each other, and we choose to live happily, even through the dark days."

The lighthouse in the dark

Matt continues to work the soundboard at his church most Sundays. Although some weeks are a struggle, he continues to fill the church with melodies. "Because of my medication, I can still do something I love," he says.

One day Matt and Karen hope to get to the Huntington Harbor Lighthouse located north of Long Island, New York, where Dr. George Huntington observed and wrote about Huntington's disease. Some in the Huntington's disease community see the lighthouse as a beacon of hope in the wake of a haunting disease. "With our love of lighthouses, it would be really special to visit that particular one some day," says Matt.

LEARNING MORE EVERY DAY

Dr. Amy Colcher is an active participant in the search for better treatments for Huntington's disease.

It is often said in the field of medicine that diagnosis is not the end, but the beginning of practice. This adage is certainly true for most specialists in neurology today. While each new discovery can help unravel the mysteries of the brain and the diseases that affect it, physicians are also concerned with identifying new and advanced treatment options for these complex conditions.

The search to better understand and treat neurological disorders drives one such clinician each day. Dr. Amy Colcher is a leading neurologist who has worked on movement disorders for the past 15 years. As Clinical Associate Professor of Neurology at the University of Pennsylvania, she began the Huntington's disease program at Pennsylvania Hospital and conducts clinical research on patients with a number of neurological conditions.

"I became interested in studying and treating patients suffering from Huntington's disease because it is a unique condition; it affects multiple systems in the brain, including everything from voluntary movements to cognition, and even personality," says Dr. Colcher.

Affects the entire family

Huntington's disease is a rare, genetic, neurodegenerative disorder that affects one in every 10,000 people. Each child of a person with the disease has a 50 percent chance of inheriting the gene. As such, some patients have a certain level of knowledge about the disease from family members who also have the disease. "Everyone is different, however, and the disease progresses differently with each person," says Dr. Colcher. "I always tell my patients not to think they will be affected in the same way as another family member."

The initial signs of Huntington's disease can be exhibited by behaviors such as having difficulty multi-tasking or being efficient at work, or having trouble driving, since people with the disease can become less aware of their surroundings. As the disease advances, patients can experience more severe problems with balance and involuntary movement. "They can lose their ability to eat, dress themselves, or even sit in a chair without falling off," says Dr. Colcher. Eventually they will become dependent upon others for care. "Huntington's disease affects the entire family," she says. "It can take away so much, and if we can alleviate some part of this with medicine so patients can do the things they love, it helps in many, many ways."

People with Huntington's disease may also experience slowed or slurred speech and may become frustrated because they lose their ability to communicate their needs and feelings. "Communication is so important and needs to be addressed first," she says. "I advise people to establish non-verbal methods for communicating early on so that they are in place and can be relied upon as the disease advances."

Collaboration increases the quality of research

Steadfast in her pursuit to improve the quality of life for those who suffer from Huntington's disease, Dr. Colcher hopes to alleviate or lessen the symptoms her patients experience. She has helped to build a worldwide database of patients and their families used by the Huntington Study Group (HSG) to help create therapeutic treatments for affected patients. Along with nearly 400 other clinical researchers around the world, Dr. Colcher hopes that coordinating efforts will facilitate larger-scale studies and advancement through collaboration. "This is a rare disease and anytime you can gain access to a larger sample it is going to have a positive effect on the quality of research you can do," she says. "While there is no cure for the disease, we are working on a number of pharmaceutical and surgical treatments, and still learning more about the condition each day."

Because her patients are anxious to try the newest treatment options, Dr. Colcher is also actively involved with several clinical trials. "I have many patients who are extremely willing to be included in clinical trials because the trials allow them to feel as though they are being productive and proactive in helping to understand the disease – not just for themselves – but for all people who suffer from it," she says. "This type of research not only advances the field, it also gives my patients hope."

HUNTINGTON'S DISEASE

- Huntington's disease is a neuro-degenerative disease that results in uncontrolled movements, emotional disturbances, and mental deterioration.
- It is a genetic disorder with a 50/50 chance of a child inheriting the disease if one parent is a carrier of the defective gene. The average survival time after diagnosis is 15-20 years.
- Chorea is the most common symptom of Huntington's disease, which is characterized by jerky, involuntary movements throughout the body.
- As the disease progresses, symptoms increase and make it difficult for the patient to speak, eat and dress. The patient eventually becomes completely dependent on others for daily functioning.

Most of Lundbeck's profits go to the Lundbeck Foundation, which channels a considerable amount to independent research.

PROFIT GOES TO INDEPENDENT RESEARCH

The Lundbeck Foundation, which was established in 1954 and owns 70 percent of Lundbeck Group shares, is one of Denmark's largest private contributors to research in the health and natural sciences.

In 2009 alone, the Lundbeck Foundation donated DKK 340 million to research. Over the last ten years, Foundation donations total DKK 1.8 billion. The Foundation has made possible a number of significant research results and is currently financing some 500 full-time researchers in Denmark and around the world.

Nanomedicine and distant galaxies

While neuroscience is a core focus area, the Foundation also donates money for research in many other areas, including cancer research, particle physics, genetics and distant galaxies. The criterion for applying for funds from the Foundation is that the money be used for high quality research in the health and natural sciences.

In 2009, the Foundation donated DKK 100 million for the establishment of three nanomedicine centres at the Universities of Copenhagen, Southern Denmark and Aarhus. Each of the three centres focuses on a specific area: brain diseases, breast cancer, and some of the imbalances in the body that can cause a number of serious illnesses. It is thought that all three centres will contribute significantly to medical care of the future.

Support for young researchers

During recent years, the Lundbeck Foundation has focused on giving grants to promising young researchers, awarding five Junior Group Leader Fellowships of DKK 10 million each in 2009. These grants enable young researchers to establish their own research teams and laboratories.

The grants for young researchers have proved a great success. The professional level of the applicants is very high, and the quality of their projects is excellent. Moreover, the grants have made it possible to attract young researchers from Denmark and abroad to the benefit of the Danish research environment.

The Lundbeck Foundation will also award five Junior Group Leader Fellowships in 2010, in addition to two large fellowships of EUR 3 million. The latter are available to researchers with established track records, experience in research team management, and demonstrated research results from either Denmark or abroad.

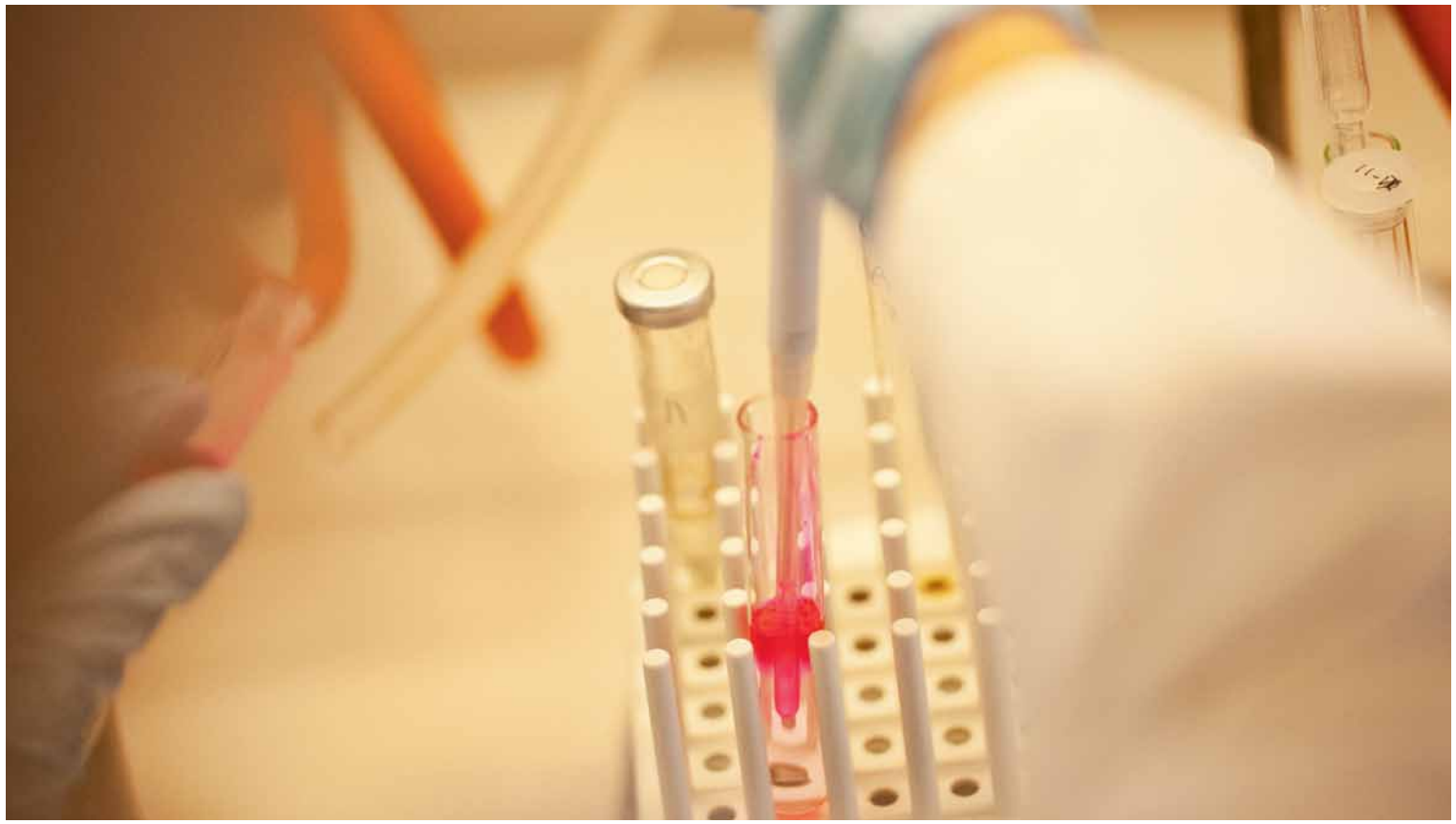
In addition to these fellowships, the Lundbeck Foundation annually awards a number of prizes – among them prizes for young talents – as well as a Nordic research prize. In all, the Lundbeck Foundation plans to donate approximately DKK 340 million to research in biomedicine and the natural sciences in 2010.

Investing in life science

Last year, the Lundbeck Foundation established a new investment unit, LFI Life Science Investments. This new initiative aims to increase focus on direct investment in small life science[1] companies both in Denmark and abroad. Here, the goal is again to promote better treatment methodologies – while at the same time providing a reasonable return on investment.

The Lundbeck Foundation's primary goal is to ensure and expand the activities of the Lundbeck Group, and to provide financial support for high-quality scientific research. In 2009, the Lundbeck Foundation donated DKK 340 million for research.

1. Research-based companies that focus on products that prevent and cure diseases.



Peter Høngaard Andersen, Executive Vice President, Research and Anders Gersel Pedersen, Executive Vice President, Development.

Lundbeck's heads of Research and Development discuss how development of pharmaceuticals has changed over the last ten years, and share their thoughts on treatments of the future.

In 2009, Lundbeck invested DKK 3.2bn in research and development, corresponding to 23.2 percent of revenue.

KNOWLEDGE – A PREREQUISITE FOR INNOVATIVE DRUGS

"The greatest progress in research took place ten years ago, when the human genome was published," says Peter Høngaard Andersen, Executive Vice President, Research. "It maps nearly 30,000 genes and is information that is available to all of us – it's even on the Internet. It has given us an enormous amount of knowledge that can be used both in researching diseases and in developing better treatments for them. Indeed, it is thought that approximately 3,500 of these genes can be affected by medication in one way or another."

The two executives agree that there is, however, still a lack of knowledge on the central nervous system. "When the human genome was published, the media thought there would immediately be a lot of new drugs," says Peter. "Unfortunately, it's not that easy."

Anders Gersel Pedersen, Executive Vice President, Development, explains: "The brain is vital to the existence of humans and higher animals, and is very complex and sophisticated. Many things can go wrong in the brain, although it also offers many possibilities for making repairs. But what really makes this difficult is the high degree of interaction between the various parts of the brain. If something is done to 'repair' one part of the brain, one can inadvertently affect another part of the brain and cause an unintentional reaction."

"There has been considerable progress in several disease areas, such as cancer, during the last 20 years," Anders adds. "Treatment is now available that significantly improves survival prognoses for people with many types of cancer that were considered fatal only 20 years ago. Unfortunately, the process of developing drugs that affect the brain is very different and much slower."

Valuable knowledge

In clinical development, getting a promising drug to be efficacious in humans is a challenge. "A substance may have demonstrated good results in research and animal models," says Anders. "But when it is tested in humans, it does not always have the effect we want. There is generally much more theoretical knowledge on what takes place in the brain than we can establish in practice."

"This is why we keep working to increase our knowledge," adds Peter. "Standard research has become cheaper and cheaper over the years, but it is expensive to create new knowledge which is fundamental to developing new and better drugs. At the same time, the authorities require more documentation. This in turn creates more knowledge because we now study and document much more than we did in the past. We don't launch more drugs now than during the last 50 years, but we do create lots of new knowledge, and we are proud of that."
Anders agrees. "Our job is to work with molecules and describe what they do in the body when one takes medicine. But I believe we must also share the knowledge we create with others. We do this actively by writing articles for scientific publications and by participating in scientific congresses."

Long wait for a drug

It can take as much as 20 years from the time researchers identify an active molecule until it becomes a drug which is available for patients. And then there is the considerable risk that the substance selected for development will never make it that far. Out of 5,000 substances created by research, only one will become a drug and reach the market. "Only a very few of our staff ever have the experience of their efforts resulting in a drug on the market," says Peter. "We therefore celebrate the milestones we pass along the way – and even the projects that don't succeed."

"We don't measure our success only by getting new products on the market. Naturally, we want to see our projects become new and better drugs for patients," explains Anders. "But the knowledge we acquire during the course of a process is also valuable. Developing drugs takes a very long time, and many projects fail. But discovering that something does not work is also valuable, because it increases our knowledge of how the brain works. Sometimes we learn more from something that fails than from something that succeeds."

Drugs of the future

The two executives expect that drugs for treatment of CNS disorders will have changed in ten years' time.

Peter says, "In ten years, I think the possibilities will be better for tailoring treatment to the individual needs of the patient. It will be possible to say that 'your illness has such-and-such characteristics, so this is the medicine you should take. It will have the greatest effect and the fewest side effects in your case.' That is what we are working towards. We want to understand who our medicine can help most, and who would benefit more from other drugs."

To this Anders adds, "I also believe that in the future, we will see many treatments composed of several types of medicine, and this will help patients even more."

"When I began working in pharmaceuticals many years ago, some acquaintances asked when I would finish my work," recalls Peter. "But we will never finish. We will not see optimal treatment of all CNS disorders in our lifetime. Tremendous progress has been made since the development of drugs for psychiatric and neurological disorders began, but there is still a great deal more we can do to give patients the best possible treatment. And that is what we are working to do."

LUNDBECK'S DEVELOPMENT PORTFOLIO

Lundbeck is engaged in research and development of new and innovative pharmaceuticals for the treatment of disorders of the central nervous system (CNS):

- Depression and anxiety
- Psychosis
- Alzheimer's disease
- Huntington's disease
- Parkinson's disease
- Epilepsy
- Stroke

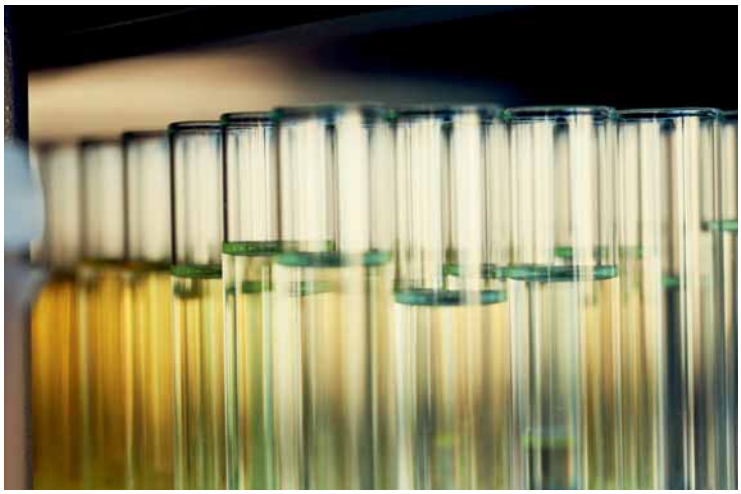
PSYCHIATRY

Compound	Indication	Mechanism of action	Phase I	Phase II	Phase III	Registration application
Serdolect® USA	Schizophrenia	Dopamine/serotonin				
Nalmefene	Alcohol dependence	Specific opioid receptor antagonist				2011
Lu AA21004	Depression + GAD	$5HT_3$ antagonist, $5HT_{1a}$ agonist og 5HT enhancer				2012
Lu AA24530•	Depression	Multiple targets				2012 +
Zicronapine•	Psychosis	Monoaminergic				2012 +
Lu AE58054	Psychosis	Selective 5-HT_6 antagonist				2012 +
Lu AA39959••	Psychosis/bipolar disorder	Ion channel modulator				2012 +

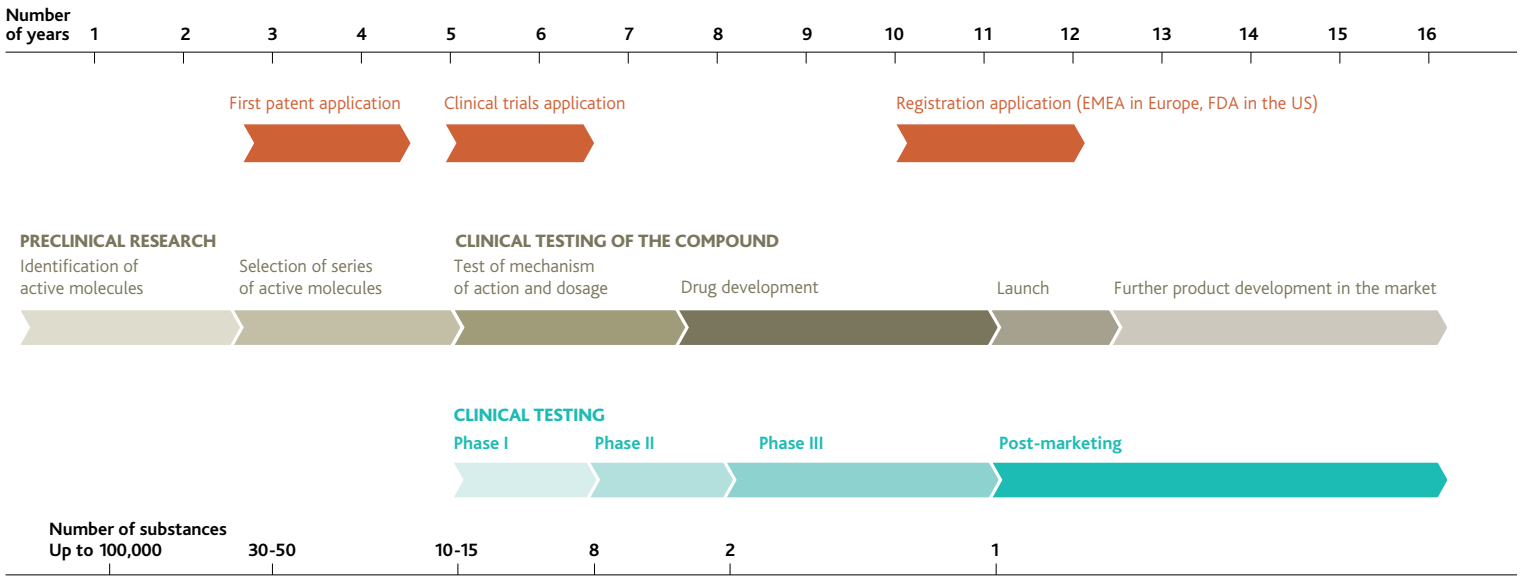
• Clinical Phase II trials with positive results
•• Clinical trials currently on hold

NEUROLOGY

Compound	Indication	Mechanism of action	Phase I	Phase II	Phase III	Registration application
Clobazam	Lennox-Gastaut syndrome	GABA enhancer				2011
I.V. carbamazepine	Epilepsy	Sodium channel blocker				2012
Desmoteplase	Stroke	Plasminogen activator				2012
Lu AA24493	Stroke/neuronal damage	Tissue-protecting cytokine				2012 +
Lu 02-750	Parkinson's disease	Dopaminergic agent				2012 +



DEVELOPMENT OF A NEW PHARMACEUTICAL PRODUCT



PHASE I
Human pharmacology
- First dose in man
- 30-150 people
- Evaluating safety and tolerability of the compound
- Evaluating toxicity, absorption, distribution, metabolism and excretion of the compound
- First indication of therapeutic value (often in healthy volunteers)

PHASE II
Therapeutic exploratory
- 100-500 patients
- Explore therapeutic efficacy in patients
- Identify correct dosage, how to take the pharmaceutical and the length of the treatment

PHASE III
Therapeutic confirmatory
- 500-5,000 patients
- Confirm that the pharmaceutical is safe and effective in the relevant disease and the current patient population
- On completion of Phase III, there should be sufficient documentation to obtain regulatory approval (registration) of the product

POST-MARKETING STUDIES
Further product development in the market

An accident left Wendy in a coma with serious injuries. When she woke up, she began to experience 'funny little nervous feelings'. Tests showed that the accident had also caused epilepsy.

ANOTHER CHANCE AT LIFE

Wendy Veasey had been enjoying a traditional US Independence Day celebration when her life took a dramatic turn. It was 1987. Wendy was 20, out with her then-boyfriend and some friends to watch the fireworks display in her hometown of Kenosha, Wisconsin, located in Midwestern United States. There was a chill in the air that night, and the group had brought chairs and blankets for comfort. After helping to pack the gear in their car's trunk, Wendy headed toward the driver's door. As she grabbed the door handle, she heard her boyfriend scream her name.

The next instant, Wendy was hit by a passing motorcyclist, tangled up in the bike and ultimately thrown 26 meters. She went into full cardiac arrest and was rushed to a local hospital. Head trauma from the accident caused her brain to swell, and she needed a shunt surgically implanted to relieve the swelling. Wendy emerged from surgery in a coma.

Her mother, Gloria, says she brought tapes of Wendy's favorite band to her bedside in hopes that the music would reach her daughter. Wendy doesn't remember anything about her three days in a coma. Although Gloria was overjoyed when her daughter woke up, Wendy had sustained serious injuries from the accident.

In addition to her head trauma, she suffered numerous other injuries including a fractured pelvis, cracked ribs, torn liver, ruptured kidney and wounds to her forearm requiring a metal plate. Wheelchair-bound when she first returned home, she began to experience 'funny little nervous feelings'. Wendy recalls, "I told my mother, 'It's like a chill running through me.' It was almost like the way a panic attack starts. I wasn't real shaky, but I was getting confused."

"What's epilepsy?"

As these 'funny feeling' episodes became more frequent, Wendy visited a neurologist. After some tests, he diagnosed Wendy with epilepsy.

"At first, I thought, 'What's epilepsy?'," Wendy says. Neither she nor her mother was familiar with the disease, which causes chronic seizures that affect a variety of mental and physical functions, and affects around 50 million people worldwide[1].

Wendy's seizures were initially mild, but still classified as epileptic once doctors identified the electrical disruptions. Pinpointing exactly where in her brain the disruptions were happening required more testing, including intracranial monitoring. Eventually, doctors determined that her seizures were traveling from one side of the brain to the other due to damage in the bi-temporal and frontal lobes. Damage in more than one area meant Wendy was not a

candidate for corrective brain surgery, and she began a long and frustrating period of trying various treatments that simply were not effective.

Dark days

Wendy's seizures grew more frequent and severe, fluctuating with hormonal changes each month, as is sometimes the case with epilepsy. "I started getting the bad grand mal[2] seizures," she says. "During the worst ones, I'd bang my head on the headboard of my bed, I chewed the inside of my mouth until it bled, and I'd lose control of my bowel and bladder." Her mother adds that Wendy would cry out, "Help!" or "Won't somebody please help me?" which Wendy doesn't recall.

Her epilepsy changed Wendy's life significantly. At its worst, her condition would cause her to seize up to ten times a day. Her mother became her near-constant caregiver – and after the two were in a car accident in Milwaukee when Wendy seized at the wheel, Gloria became the sole driver.

"I've done some bizarre things when I had the bad grand mals," Wendy recalls. "I bit my mom in the neck at the State Fair. I danced on the escalator at the mall, snapping my fingers, rocking back and forth. I didn't even know – I was out of it."

Her boyfriend broke off the relationship. "Because of the changes in my behavior and my frequent seizures, he couldn't deal with me," Wendy says. "I lost friends, and I lost my job. I was depressed. I was at home all the time because I wasn't working. I'd sit in front of the TV, depressed. Not a lot of friends were coming around. People were afraid of me having a seizure. They were worried they wouldn't know what to do."

Wendy and the doctors she saw locally and in nearby larger cities tried an array of treatments to try to control her epilepsy, but nothing seemed to work. "I was like a guinea pig with all these different medications," Wendy recalls. "Numerous medicines didn't work, and they'd double up some of them, and then take me off," Wendy recalls. "I was really drugged up at times, and I dropped to 89 pounds [40 kilos]. I tried more than five different medications but none of them helped me."

Wendy says that the seven-plus years she lived with uncontrolled epilepsy seemed like an eternity. She tried to hold a job in retail, but says her supervisor was so afraid of her having a seizure, that he found another excuse to let her go.

New hope

In 1993, a neurologist discussed a procedure with Wendy called vagus nerve stimulation, in which an implanted stimulator sends electric impulses to the brain via a large cranial nerve in the neck. Wendy's grand mal episodes had died down a bit, and after a frank discussion with her doctor, she opted against the implant. The neurologist then told Wendy about a new drug study for epilepsy patients. Wendy quickly signed up.

"My life changed for the better, 100 percent," Wendy says. "I quit having grand mal seizures. I got down to barely any seizures. Once a month I might have a day with a couple of little clusters of auras, which are warning sensations before an attack of epilepsy. I don't lose consciousness or awareness, I just get a little confused. It's a nervous little feeling again, like, 'Oh, I'm having a little spell.' I might just leave the room, walk out and come back, and it goes away. Nothing really happens anymore. I'm able to drive, and on days when I feel 'seizurey' or if I don't feel good, I just don't drive, because I know it's like a few-day spurt, and then it goes away."

When the drug trial ended, her doctors helped Wendy continue to obtain the medication that was working so well for her. Wendy is coming up on her 16th anniversary of being on the treatment – and of an improved quality of life.

Giving back, not giving up

Today, Wendy is happily married to Mark, whom she met just before the clinical trial began. She is helping her mother through some health issues, just as her mother was there for her when epilepsy robbed her of a normal life. And she works part-time as an educational assistant, working with children who have conditions like epilepsy, cerebral palsy and muscular dystrophy." With a laugh, Wendy says, "I'm changing diapers and wiping hinders! I'm dispensing medicine and helping with tube feeding." Becoming emotional, she continues, "I figure it's my way of giving something back, because I got a chance at life again, and I want to help them."

Finding the right physician is her primary piece of advice for anyone diagnosed with epilepsy. "Shop around until you find a doctor you can look in the eye and who listens to you. Not someone who is going to rush you out of the office."

"There is so much you can work with," she says. "Don't give up."

1. WHO (World Health Organization).
2. According to The Epilepsy Foundation, the most common and well-known type is a generalized seizure called grand mal, which includes both stiffening of the limbs and jerking of the limbs and face.

EPILEPSY

Epilepsy is a chronic disorder of the brain that is characterized by recurrent seizures. A seizure happens when a brief, strong surge of electrical activity affects part or all of the brain, and can last from a few seconds to a few minutes.

Seizures can vary from the briefest lapses of attention or muscle jerks to severe and prolonged convulsions.

Epilepsy increases a person's risk of premature death by about two to three times compared to the general population.

THIRTY-ONE MONTHS AND COUNTING

Kyle was a beautiful and active baby when he suddenly started to change.

"In looking back, there were signs that something was wrong; signs we didn't really notice at the time and that took doctors significant time to figure out as well," says KC Butt, mother of four-year-old Kyle Butt from Swampscott, Massachusetts, in Northeastern United States.

Kyle's parents remember how wonderful he was when he was a tiny baby - sleeping beautifully, playing and engaging with them. He was developing on a normal track. Then, at three months, he started to smile less, and began looking wistfully off to one side. "He wasn't fussy, just kind of disconnected," his mother recalls, adding, "In the months that followed, he began to give us an airy, distant look, and it seemed as though he was drifting away from us."

When his regular check-ups seemed to show nothing unusual, the Butts thought the differences they were noticing in Kyle were associated with his diet. Then, Kyle started to have violent jerking motions several times a day, where his whole body moved forward from the waist. His personality also began to change.

When Kyle was nearly five months old, his pediatrician suspected Kyle's problem might be more serious and asked the family to bring Kyle in for an EEG[1].


Roots
POLO

"As we were headed in with Kyle to have the EEG, the doctor put his hand on my shoulder and told me to try not to worry. He had never done that before," says KC, "and I began to feel that this wasn't good. I began to feel that something was terribly wrong."

Diagnosis and uncertainty

While the doctors weren't entirely sure about Kyle's condition or his prognosis after that first EEG, they knew it was serious. In shock, KC, Mark and little Kyle were sent immediately to specialists in Boston for further testing. Kyle spent a grueling week undergoing a number of tests to determine the cause and extent of his condition. In hopes that the problem was simply a vitamin deficiency, Kyle was given vitamin injections.

As Kyle lay in the hospital bed covered by cords leading to several monitoring devices, the seriousness of his condition began to unfold. "I'll never forget when the doctor came in to speak with us," says KC. "She told us that Kyle had infantile spasms, one of the most severe forms of pediatric epilepsy, but they didn't know why. Through my tears I asked the doctor if Kyle was going to live, and the doctor said that she couldn't tell us for sure. She said that the seizure activity in Kyle's brain was so intense, they didn't know his fate."

Before that moment, KC and Mark didn't know much about epilepsy and immediately began to do their own research. They read everything they could get their hands on to learn more. The more they read, the more they began to understand that Kyle's life was changing, but they weren't fully aware of how, or to what extent.

Kyle began to have more and more seizures, sometimes up to 50 a day. When a seizure struck, he would just drop to the floor. "I would be tying his shoe or getting him some milk," KC remembers, "and he would begin to seize and just fall over. It was terrifying."

"Kyle began to have more and more seizures, sometimes up to 50 a day. When a seizure struck, he would just drop to the floor."

She adds that the hardest part of watching your child have a seizure is knowing there is nothing you can do. The Butts taught Kyle's siblings that when Kyle was having a seizure, to just stroke his back and tell him that they love him.

"Sometimes we'd be driving in the car and from the back seat the kids would scream, 'Mom! Kyle is having a seizure!' During these moments, we would all try to stay calm, tell him that it was going to be okay, and sing to him," says KC. "His favorite was *You Are My Sunshine*. And, after a verse or two of the song, he'd stop seizing, and we could breathe again."

Struggling to find the right treatment

The doctors put Kyle on several medications to try to reduce the seizures. The medications made a significant difference in the number of spasms Kyle suffered. Over time, however, Kyle began suffering from other types of seizures, leaving the Butts and Kyle's doctors continuing to struggle with how to best help Kyle.

Although Kyle couldn't communicate that well, his spirit came through in all he did. "Kyle is a determined child, and just won't give up," says Mark. "When he was about 13 months old, he really wanted to walk like his older siblings. I'll never forget the day he stopped everything else and got himself to stand and walk.

INFANTILE SPASMS

Infantile spasms are a difficult-to-treat form of epilepsy that usually strikes infants between three and six months old. An estimated 8,500 infants in the US have been diagnosed with infantile spasms and each year approximately 2,500 new cases are reported in the US.

It required so much effort and focus for him to do this that other developmental milestones suffered as a result." From that point on, Kyle stopped talking and began to regress in other areas.

After considerable effort to localize where the seizures were occurring so the doctors could identify more targeted treatment options, Kyle's doctors called to say that tests had finally revealed a focal lesion in the right posterior portion of Kyle's brain. KC reflects: "That didn't sound like good news to me, but at this point we were grasping at anything."

After visits to several specialists around the US to gather opinions, it was determined that the best course of action was to surgically remove three of the four lobes in the right side of Kyle's brain, consisting of the parietal, occipital and temporal lobes.

"We were devastated," says KC. "The doctors had a model of the brain and showed us exactly how much of Kyle's brain would need to be removed. When we were looking at it, we thought, 'What kind of life would this leave for Kyle? What would this mean for his development?' It was crushing."

Kyle's doctor said, "I can't tell you if Kyle will ever dress himself or balance a check book. But, I can tell you that if he has the surgery, you will give him a better chance at life."

Major surgery

"The morning of the operation I just lay in his crib with him," says KC. "We knew it was the best option for him, but we had to force ourselves to bring him to the hospital. No parent should have to make this choice."

Then it was time for Kyle's anesthesia. "He had been put out so many times already in his little life, and I always sang *You Are My Sunshine*," says KC. "So, I started to sing, and then all of the nurses and doctors started to sing with me. The room grew loud with all of our voices. It was an unbelievable and touching moment."

After nine hours of surgery, Kyle woke up. "He looked right at me," KC says, "not through me, not by me – but right at me. He looked at me in a way that he had never looked at me before, and with his eyes locked on mine, said 'Mama!' It was as if the lights had been turned on!"

A typical four-year-old

From that moment forward, Kyle was a different child. He began to walk and talk again and to develop physically, cognitively and emotionally. The Butts now refer to May 17, the day of his surgery, as his other birthday. In many ways, they say, it's the day he was reborn.

Despite one severe seizure that struck Kyle a week after the surgery, life began to get easier. Kyle continued on the anti-seizure medication to try to keep the spasms at bay. "We started counting," says Mark. "One month without a seizure, two months, six months, one year – the length of time kept growing. Today we are so overjoyed that Kyle has gone more than 31 straight months without a seizure."

When Kyle turned three years old, he began an integrated preschool with special services to aid in his development. "Now, at four years old, the teachers tell us that anyone would be hard-pressed to tell that Kyle had such a rough introduction to life," says Mark. "They would never guess his history, or that he is missing almost half of the right side of his brain."

"The worry of Kyle having another seizure is always in the back of our minds though," says Mark. "That's something that may not ever go away, but at least now it doesn't consume every thought."

In many ways, Kyle is a typical four-year-old boy. He loves Mickey Mouse, soccer, and playing outside and getting dirty. "We never expected this. We never dared hope that he would get to this point – to go this length of time without a seizure. I just wanted the seizures to slow down and to have a chance to reconnect with our son. To see Kyle do the things he can do now, and say the things he can say – it's simply a miracle," Mark says.

When he begins school next year, Kyle's teachers are strongly considering putting him in a mainstream class. Although he'll never be able to drive a car or play in formalized sports because his surgery left him with vision loss in the left field of each eye, the Butts say this limitation is small in comparison to his previous condition.

"We were very fortunate to have had the family and the support system to survive this," says KC. "We've been very lucky to have the outcome that Kyle has had, and we want to help others who may not be able to navigate the diagnosis, the hospitals, and all of their choices."

Raising awareness

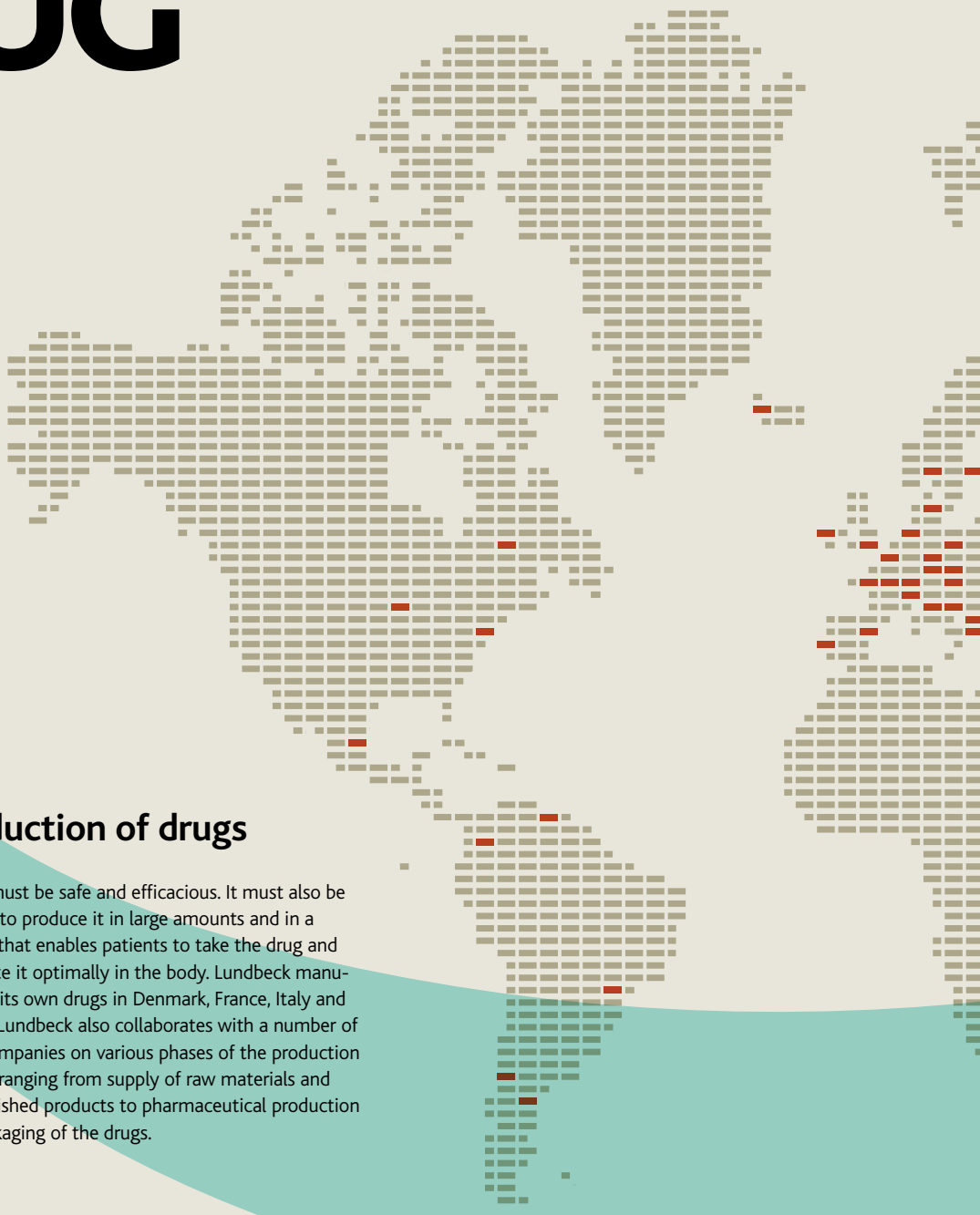
One way in which the Butts have dedicated themselves to the fight against epilepsy is through *Miles for Kyle*[2], an annual race that was started by Kyle's aunt in order to help defray some of the costs associated with his treatment.

"When you talk about epilepsy, it is not uncommon that people are fearful and think that patients with epilepsy are doomed to a difficult life," says Mark. "We want to bring awareness and education about the disease and show people that there are options."

The Butts hope the annual race will continue to grow and raise awareness about epilepsy. In the fall of 2009, the race had over 150 entrants, raising close to USD 10,000. "We spent so much time doing research to make the various decisions for Kyle that we want to help others understand their choices. We want to show people that there is hope and that there is sunshine. It's a small thing – but it's a start."

1. EEG: Electroencephalography, which is a recording of the electrical activity along the scalp.
2. Read more at www.milesforkyle.com

FROM IDEA TO DRUG



Distribution of drugs

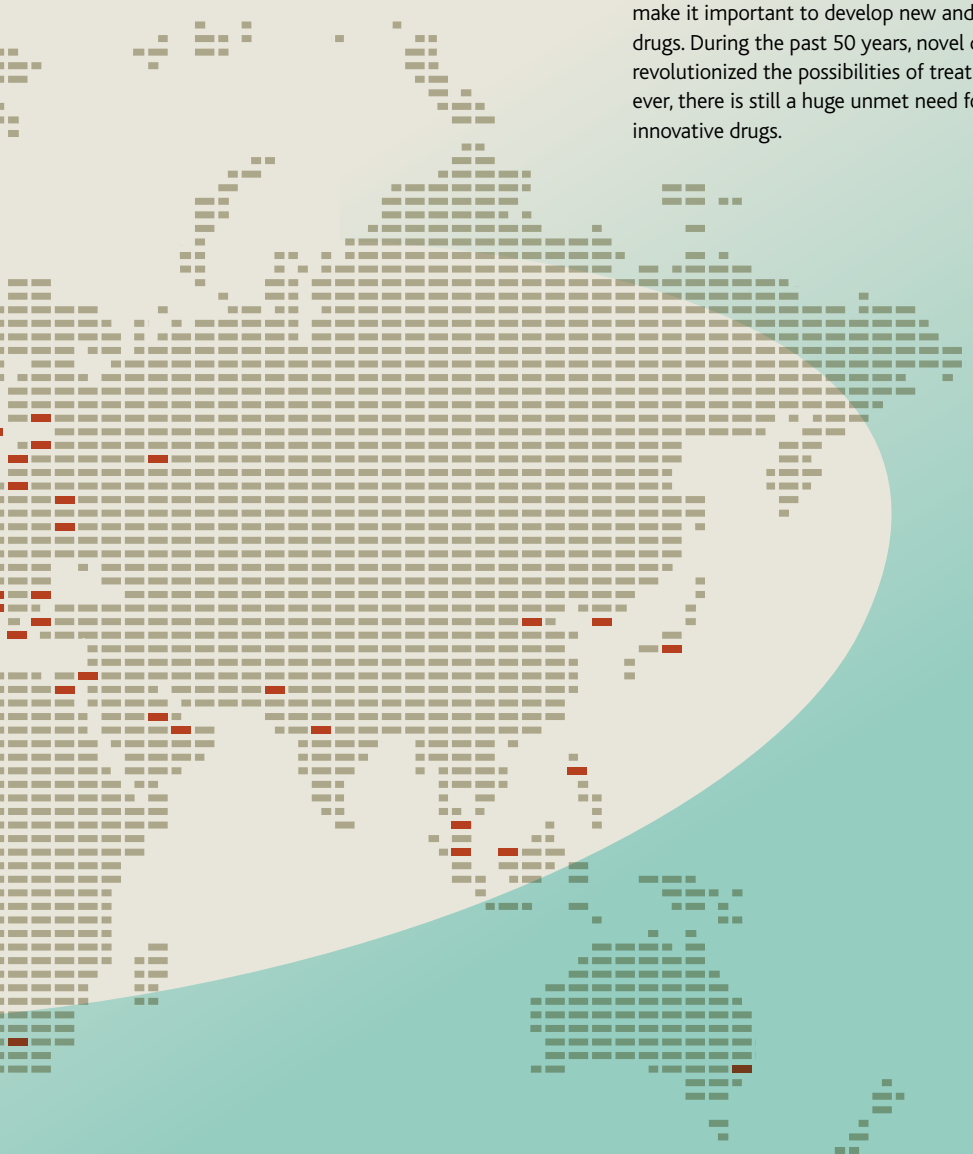
Lundbeck's drugs are registered in more than 100 countries. Lundbeck's own representatives are in charge of spreading the knowledge of Lundbeck products in 56 countries. As Lundbeck products are prescription drugs, doctors must decide when patients will benefit from them. Lundbeck spreads knowledge of its products through publications in scientific journals, participation in scientific conferences, and through meetings with doctors and specialists.

Production of drugs

A drug must be safe and efficacious. It must also be possible to produce it in large amounts and in a manner that enables patients to take the drug and assimilate it optimally in the body. Lundbeck manufactures its own drugs in Denmark, France, Italy and Mexico. Lundbeck also collaborates with a number of other companies on various phases of the production process, ranging from supply of raw materials and semi-finished products to pharmaceutical production and packaging of the drugs.

700 million in the world

According to the World Health Organization (WHO), more than 700 million cases of disorders of the central nervous system are reported each year. These are serious and life-threatening illnesses that affect not only patients' quality of life, but also that of their families and friends. For society in general, the major economic consequences caused by these conditions make it important to develop new and innovative drugs. During the past 50 years, novel drugs have revolutionized the possibilities of treatment. However, there is still a huge unmet need for new and innovative drugs.



From idea to drug candidate

Lundbeck has research units in Denmark and the United States. The basis for a new and innovative drug is deep insight into the disorder itself, and into the unmet needs of patients. The process takes between three and five years, during which researchers work to identify where in the human organism a new drug must act and to test substances for efficacy, side effects and toxicity. If a substance passes all of these tests, it becomes a drug candidate.

From candidate to approved drug

Lundbeck conducts the development activities that are necessary for a drug to be approved in some 40 countries around the world. First, a substance is tested in healthy persons for its tolerability, assimilation and distribution in the body. Following this, its efficacy and side-effect profiles are tested in a small group of patients. In the third and decisive phase, the drug is tested in a large group of patients. Developing a new drug is very demanding, and normally takes between eight and ten years.

Colleen was 42 years old and living life at full speed when she noticed that her toes started curling. When she was diagnosed with Parkinson's disease a few months later, she decided to change her life completely.

ADJUSTING TO A NEW REALITY

Four years ago, Colleen Henderson-Heywood found herself sitting in her car outside a specialist's office. After nine months of consultation with specialists, she had just received the news that she had Parkinson's disease. "I decided that the disease would be allowed to rob me of just one day," Colleen explains, adding, "So I spent the next four hours ringing everybody in my address book to tell them about the diagnosis. They were upset, but I told them I would be fine; that being outside looking in is worse than being inside looking out."

Thus began Colleen's new life: "When I woke the next day, I started to get on with my life. And my life has changed beyond recognition. But not in a bad way," she says. Colleen started proactively changing all aspects of her life to accommodate the consequences of her illness now and in the future. Colleen explains: "One of the first things I did was to resign from my challenging job before I became the weak link in the team. Nobody suggested that I was incapable; I just wanted to leave before I failed. So I established my own company that I have since passed on to the people who helped set it up."

"I also stopped thinking about everyone else and started thinking about me," says Colleen. "And surprisingly, I find that being selfish makes me less selfish. The better the person you are for yourself, the more of a person you become for someone else. It is like the oxygen mask on the plane where you are told to fit your own mask before you help someone else with theirs."

Flip-flop Frisbee

The first sign that something was not quite right with Colleen's body was when the toes of her right foot started curling. "It was wintertime and I had been wearing boots so I thought they were pinching my feet," Colleen remembers. "Then I spent three weeks in Mexico wearing flip-flops and thought the toes would straighten themselves out. But I couldn't keep my shoes on my right foot – the foot would shoot the shoe off at some distance, I called it a flip-flop Frisbee. It didn't disconcert me; I just thought it was odd."

In fact, Colleen chose to ignore her right foot. Four or five months later, she went to Barcelona and found herself standing across the road from a café she wanted to go to. "I set off towards it but didn't move. I was stuck. I kept sending the signal to my body to walk to the café, but I couldn't get my right leg to move," Colleen recalls. "I had a tantrum there and then out of sheer frustration, I threw my bags down. Then I twisted to pick up my bags – and this released my body. After this, I finally went to see my doctor. He said he had no idea what was wrong with me, but would start a process of elimination."

Colleen was referred to a wide range of specialists including a chiropodist, a physiotherapist, and an osteopath. In the end, all that was left to look at was neurology.

Diagnosis and treatment

Colleen was sent for a scan. "At no point was I scared or frightened," she says. First she went for an MRI scan and the specialist rang to tell her it wasn't a brain tumor. "It hadn't occurred to me before then that it could be something of that severity," she recalls. Finally, Colleen had a DAT scan[1], which is used to diagnose Parkinson's disease.

"The specialist rang and asked me to come and see him. He asked me to sit down. I said, 'No, I just want to know now'. 'You have Parkinson's disease,' he said. I replied: 'Thank goodness for that! At least I now know and can get on with my life and you can do something for me.' I was given the name of a nurse who specializes in Parkinson's disease and information about the Parkinson's Disease Society of the UK and told to come back in a couple of weeks to start treatment."

Colleen's initial optimism did, however, suffer a blow: "I mistakenly thought that there would be a treatment that solved everything; that I would have medication that would allow me to walk normally. Unfortunately this wasn't the case."

Colleen has tried many different kinds of medication and says that they initially have an effect. "Mainly side effects!" she laughs. "You have to find the balance between the benefits and side effects of a treatment – how much can you tolerate to achieve clinical effect?" Colleen suffered from chronic nausea in the first 18 months of treatment. "I would crawl about on my hands and knees and could hardly eat anything – I lost 50 percent of my body weight." Nausea is still one of the side effects of Colleen's treatment, but she says it is not as bad as before.

Nevertheless, Colleen doesn't seek alternative information about the treatment of her illness: "I don't read about or discuss current or potential treatment options with others. I don't want to be drawn into speculation. I trust my specialist to find the treatment that's right for me."

Preparing for a different future

In the midst of her new reality, Colleen met a new partner. Philip and Colleen decided to move together to a place where Colleen would be able to lead a good life when her illness begins to seriously restrict her movement. Leaving their home in the north of England to scour the Scottish countryside for a suitable place, they came across the tiny village of Duns. "We had never heard of the village before, but we knew immediately that it was perfect for me," Colleen says. "I wanted to be somewhere where I can walk to the shops or access them in a wheelchair when

my movement becomes restricted, and in a small community where I won't be embarrassed to ask for help if I need it."

The couple found a house right behind the market square and Colleen set about introducing herself to the people in the village. "I made a point of telling people why I sometimes walk a little awkwardly," she says. "I'd rather people know that I have Parkinson's disease than they should start wondering what is wrong with me." Colleen also quickly got involved in community activities, organizing a fashion show for the local charity shop and taking steps to start a Saturday club for young creative people in the area.

Backwards or sideways does the trick

When asked which symptoms of Parkinson's disease have the most impact on her life, Colleen quickly responds: "Insomnia. I've only slept two to three hours a night for the last four years. I think it is partly due to the illness, partly a side effect of the medication. But it is just as well that I have many hours awake, because there are so many things I want to do!" But every now and then Colleen sleeps a whole day away and she also has to rest during the day.

Colleen describes her symptoms: "I woke up at four o'clock this morning and was very slow to get going. I have to roll out of bed because my body doesn't move too well. And I suffer from terrible indecisiveness. Today it took me two and a half hours to decide which skirt to wear. For a woman who was previously very much in control of her life it has more impact than not being able to walk so well. I have taken a double dose of medication today, but still I have to put my right hand on my leg to reduce the tremor. And as soon as I get out of my environment it becomes a bit of a challenge. Sometimes I can't walk because my brain doesn't tell my body to walk. But I can trick it by walking backwards or sideways and then get it back into action. If I walk into the kitchen and there is more than one task to take care of, I am overwhelmed and walk out again. I am also on a permanent emotional roller coaster – one moment I am sad and tearful and the next I am fine again."

PARKINSON'S DISEASE

Parkinson's disease is a progressive, degenerative condition caused by the degeneration of dopamine-producing cells in the brain. Symptoms include rigidity, slowness of movement, shaking, involuntary movements, weak or lower voice volume and frozen facial expressions. Someone with Parkinson's disease may have trouble starting to walk, appear to be falling forward as they walk, freeze in mid-stride and have difficulty making a turn.

Symptoms will increase as the disease progresses. According to the World Health Organization, there are five million cases of Parkinson's disease worldwide at any given time, and one percent of the population over 65 is affected.

1. A brain scan using a radiopharmaceutical drug injected into the brain. The scan allows assessment of the numbers of dopaminergic cells in the brain. A reduction in numbers of these cells suggests Parkinson's disease or a related Parkinsonian condition.

She continues: "I love writing and I love words, but I can lose sentences, forget what we are talking about, and become momentarily dyslexic. I can be speaking to 300 people and then suddenly not remember where I had got to. I also suffer from chronic fatigue – an hour and a half after I've taken my medication I could go to sleep, but I don't want to, so I make sure I am occupied by doing something I love. My stamina isn't good – if I have plans for the evening, I must rest all afternoon."

Without medication, Colleen's movements would be a lot slower. "The medication alleviates my symptoms, but it doesn't take them away. But if I forget to take the medication, I will quickly realize, as I begin to slow down."

"Illness is by my side, not in front of me"

"I don't consciously think about my illness. It is by my side, not in front of me. It is only when I take my medication that I am reminded that I am a patient. I am physically but not mentally restricted," Colleen says.

She has a mission to try and show people with Parkinson's disease that they should not feel that they have lost their lives. She puts her mission into practice by speaking as a patient at Parkinson's conferences and sitting on various advisory committees for the Parkinson's Disease Society of the United Kingdom.

"Illness is incredibly lonely, you are isolated, and you can even feel alone in a room with 200 other Parkinson's patients. Yet there is a link and a common understanding, so these forums also play an important role," she explains. "I have a window of good health and then I know it will go downhill. I have to have maximum impact now. Patients must believe that they can have a full life, that they can do something themselves to improve things. I feel compelled to make that message known – it is a tragedy if people feel their life is over. Yes, there are things you did before that you can no longer do. But don't focus on them – focus on the things you *can* do. Try things you have never tried before. Reinvent your life. You have to make a great change. It's hard to do when you are ill, but you have to put your toe in the water."

"Life is a journey but we have never been prepared for the part when we are diagnosed with a serious illness."

MOOD ABOVE MOVEMENT

Mary Baker has worked tirelessly to promote the needs of patients with Parkinson's disease for more than 25 years.

In 1984, Mary Baker's neighbor developed Parkinson's disease and Mary agreed to accompany her to a self-help group meeting. At the meeting, Mary noticed that all the participants had tremor and were finding writing difficult. She quickly realized that she was the only one capable of doing the notes and volunteered to do so. "My husband, knowing that I don't do anything by halves, asked me not to become further involved," Mary recalls.

But it was already too late. Within six months of this first meeting with Parkinson's patients, Mary was the Welfare Director of the Parkinson's Disease Society of the United Kingdom (PDS-UK) and well on her way to making her mark. "It was only a small society then, dominated by doctors and the search for a cure for Parkinson's disease and nothing else," Mary explains. "But to me, the welfare program was as important. At this point in time, there was no recognition of dementia associated with the condition, although research showed that one third of all Parkinson's patients would develop dementia. Neither was there any information nor recognition of young onset of the disease. Nobody was capable of talking to young Parkinson's patients about the financial, marital, sexual and career implications of the disease. I believed that both issues were something that had to be addressed and set about doing my part to get them on the agenda."

Quality of life

Towards the end of the 1990s, it was clear that many of the patients' needs were not being met by the current management of their illness. A survey was conducted in fourteen countries in Europe asking patients and families living with Parkinson's disease what aspect of the illness was their biggest challenge. The survey showed that one hundred percent of the families responded that the management of medication was the biggest challenge. "As a result, with the help of resources from the central office of the Parkinson's Disease Society and money held in the branches, together with a generous contribution from the pharmaceutical industry, Parkinson's disease nurse specialists were established," Mary says. "Education courses were developed in England, Scotland, Wales and Northern Ireland with full cooperation of the nursing profession and the University departments with an interest in educational training programs, and from these small beginnings there are now over 250 nurse specialists within the United Kingdom. Working with the International Council of Nurses (ICN), we were really happy that the international basic competencies were developed and launched in 2009 at the International Council of Nurses' conference in Durban, South Africa."

A global Parkinson survey supported by the World Health Organization (WHO) in 1997 looked at needs of patients in the countries of the world with the most expensive health systems (the US, Canada, Japan, the UK, Spain and Italy). Nearly 2,000 patients were interviewed on the factors that had the most impact on their quality of life. The survey showed that the psycho-social aspects of the disease had the greatest impact on patients' lives. "Only a little more than 17 percent said that movement disorders, together with the medications, had the greatest impact on their quality of life. More than 40 percent were depressed, not clinically depressed, but concerned about the future: their work, finances, marriage and relationships," Mary says, adding, "that is why it is so important that doctors listen carefully to what their patients say they need. If they need support and advice, they need referrals to psychologists or counselors. It really is vital to look for the hidden face behind these presenting symptoms and to develop neurological services to better manage the illness."

Correct data to get through to decision makers

Key to achieving improved and appropriate care for patients is dialogue between patient organizations, clinicians, academia, healthcare decision makers and pharmaceutical companies. Mary states: "As a non-governmental organization, you have to collect your evidence and data to substantiate your proposals for change. You have to know the cost of the treatment within the national health budget and the cost of not treating the illness. In the PDS-UK for instance, we were able to

demonstrate that the cost of keeping someone at home within their family would increase fivefold if they needed to go into institutional care. The 'tipping points' were falls, incontinence and loss of mental capacity. Therefore it is very important to develop programs to try to prevent this from happening."

A broader approach to healthcare

"Nowadays, the biggest challenge is securing new treatment options for the patients," Mary explains. "Pharmaceutical companies have to meet a series of criteria before their medication can become available to the patients. Firstly, they have to satisfy regulatory standardized requirements, and then they have to convince the payers that their product should be funded." Mary feels the focus on safety in recent years has stifled innovation in development of new treatments: "You have to educate society to understand the benefits and risks of medication. Regulatory bodies and payers should give more attention to patient recorded outcomes rather than just the results of clinical trials."

In Europe, raising awareness about a disease is very important in order for it to be recognized and implemented into a framework program. The advocacy organizations under the European Parkinson's Disease Association, of which Mary is Patron and its former President, have succeeded in getting Parkinson's disease into

ABOUT MARY BAKER

Mary Baker has been an advocate for patients suffering from Parkinson's disease for more than 25 years. She retired as Chief Executive of the Parkinson's Disease Society of the United Kingdom in 2001, where she had worked for 18 years. Mary is currently Patron of the European Parkinson's Disease Association, where she served 14 years as President, as well as President of the European Federation of Neurological Associations, Vice President of the European Brain Council, Consultant to the World Health Organization (WHO), Chair of the Working Group on Parkinson's Disease formed by the WHO in May 1997, a member of the IMI Scientific Committee and has been appointed by the Council of Europe to sit on the European Medicines Agency Management Board.

the European Commission's Seventh Framework Programme, which determines the amount of funds allocated for research into a particular area.

Mary is also involved in the European Brain Council, which consists of neurologists, neurosurgeons, neuro-pharmacologists, psychiatrists and the pharmaceutical and biotech industries. By raising awareness, the Brain Council has managed to include 'The Brain' in the Seventh Framework Programme and is endeavoring to work with the Commission to see if 2013 can be designated the 'Year of the Brain' throughout Europe.

The patient associations seem to have achieved quite a lot in recent years, so do any obstacles remain? "Yes," says Mary. "There is still a lack of resources for healthcare in general. We are all competing for the same resources by promoting our particular diseases, but I believe we will achieve more by uniting and working together. Working with the members of the European Parliament who are interested in the brain ensures that the voice of people living with brain disease reaches the policy makers. This horizontal cooperation is very important. As for Parkinson's disease in particular – and this is, of course, also the case for many other diseases – the Holy Grail is still to find a cure."

THE EUROPEAN PARKINSON'S DISEASE ASSOCIATION

The European Parkinson's Disease Association (EPDA) was founded in 1992 and currently has a membership of 43 patient organizations from 26 European countries. The EPDA aims to ease the lives of people with Parkinson's disease and their families and carers by promoting constructive dialogue between science and society, and by encouraging and supporting the development of national Parkinson's disease organizations.

THE EUROPEAN BRAIN COUNCIL

The European Brain Council (EBC) was founded in 2002 and is a coordinating council formed by European organizations in neurology, neurosurgery, psychiatry and neuroscience, patient organizations and the pharmaceutical industry. Its mission is to promote brain research in Europe and to improve the quality of life of those affected by brain diseases. It represents a vast network of patients, doctors and scientists, and these stakeholders along with its industrial partners make it eminently suited to work in close partnership with the European Union commissions, the European Parliament and the World Health Organization (WHO), as well as other decision-making bodies. In Europe, 127 million persons suffer from a brain disease, and the EBC endeavors to improve their situation by concentrating the collective efforts of scientists and laymen from this very wide field. The EBC has offices in Brussels and Florence.

95 YEARS OF

COMPANY MILESTONES


Hans Lundbeck


Poul Viggo Petersen


Grete Lundbeck


Lumsås, 1961

1915-1929

The first years as a Danish trading company

Hans Lundbeck founded an agency in Copenhagen on 14 August 1915. The company dealt in everything from machinery, biscuits, confectionery, sweeteners, cinema equipment and cameras to photographic paper and aluminium foil, besides renting out vacuum cleaners. During its first years, the business was operated as a trading company, but, from the mid-1920s, pharmaceuticals were added to its range of products. Eduard Goldschmidt was hired in 1924, bringing into the company a number of new agency contracts for drugs: suppositories for haemorrhoids, painkillers etc. Cologne and creams were also added to the portfolio.

1930-1944

Expansion in manufacturing and research

In the 1930s, Lundbeck began production and packaging of pharmaceuticals in Denmark. To ensure sufficient manufacturing capacity, the company moved to the Copenhagen suburb of Valby in 1939, where Lundbeck headquarters is situated today.

Hans Lundbeck died in 1943, and Poul Viggo Petersen was employed to build up Lundbeck's pharmaceutical research. Thanks to his efforts, Lundbeck was able to create a niche for itself in psychopharmaceuticals.

1945-1959

The foundation of Lundbeck's CNS expertise

During the years following World War II, Lundbeck intensified its research, laying the foundation stone for the drugs which would later make Lundbeck world famous. In 1954, Mrs Grete Lundbeck, the widow of Lundbeck's founder, established the Lundbeck Foundation for the purpose of ensuring and expanding Lundbeck's business operations, as well as for providing financial support for primarily scientific objectives and the fight against diseases.

1960-1974

Expanding Lundbeck goes international

Lundbeck's success with Truxal® for the treatment of schizophrenia increased the need for additional production capacity. In 1961, Lundbeck purchased a former creamery in Lumsås and soon began production of active compounds. Between 1960 and 1970, the number of employees doubled to 680, of whom approximately 100 were employed abroad. Lundbeck was becoming an international company.

1975-1989

Lundbeck defines CNS as its primary focus

After 60 years of growth and development based on a wide assortment of products, Lundbeck decided at the end of the 1970s to phase out its existing agencies and cosmetics departments. After that, the company would focus on development and commercialization of drugs.

At the close of the 1980s, Lundbeck further intensified its business strategy focus. In future, Lundbeck would dedicate its efforts to development, manufacturing and commercialization of drugs for the treatment of diseases and disorders of the central nervous system (CNS).

1990-2004

Expansion propelled by Cipramil® success

Lundbeck expanded rapidly in the 1990s, due to the success of Cipramil® for treatment of depression. Cipramil® was registered in more than 70 countries and grew to account for the major share of Lundbeck's business operations.

To ensure its continued success, Lundbeck intensified its research activities and began in-licensing drugs from other pharmaceutical companies. This enabled Lundbeck to launch new drugs to take over when the patents on other drugs expired.

In 2003, Lundbeck acquired the American research company Synaptic, thereby establishing a research unit as a bridgehead in the United States.

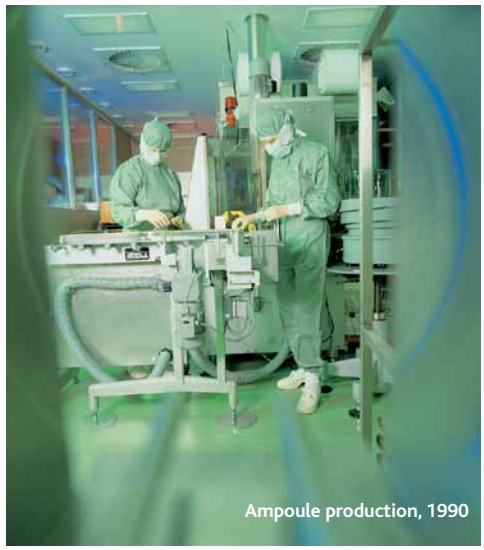
2005-

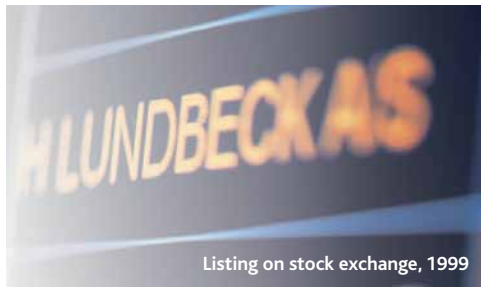
Best CNS company

In 2009, Lundbeck acquired Ovation Pharmaceuticals, Inc., establishing Lundbeck's own platform in the United States, the world's largest market for pharmaceuticals. Lundbeck also acquired Elaiapharm in France, thereby increasing the company's production capacity. At the end of 2009, Lundbeck had more than 5,900 employees in 56 countries.

Lundbeck's ambition is to be the world's best CNS company. With more than 50 years of experience in development and commercialization of CNS drugs, Lundbeck has a solid foundation for fulfilling this ambition.

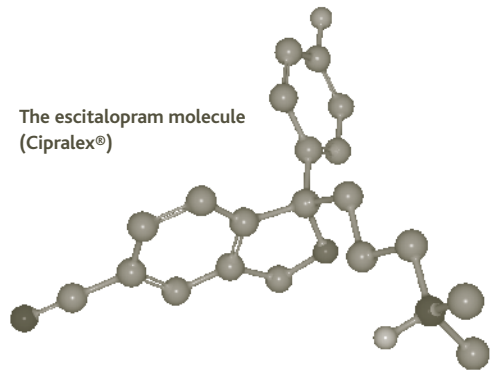
LUNDBECK


Ampoule production, 1990



Listing on stock exchange, 1999


Lundbeck Research USA, 2003


The escitalopram molecule (Cipralex®)

PRODUCT MILESTONES

1937 Epicutan®
Lundbeck launches its first original drug, Epicutan® for the healing of wounds.

1940 Lucosil®
Lucosil® is launched for the treatment of urinary tract infections.

1959 Truxal®
Truxal® is launched for the treatment of schizophrenia.

1960-75
During these years, a number of drugs for the treatment of psychiatric disorders were launched.

1989 Cipramil®
Cipramil® is launched in Denmark for the treatment of depression and plays a large role in Lundbeck's expansion.

1996 Serdolect®
Serdolect® is launched for the treatment of schizophrenia.

2002 Cipralex®
Cipralex® is launched for the treatment of depression and soon becomes Lundbeck's leading drug.

2003 Ebixa®
Ebixa® is launched for the treatment of Alzheimer's disease.

2005 Azilect®
Azilect® is launched for the treatment of Parkinson's disease.

2008 Xenazine®
Xenazine® is launched for the treatment of chorea associated with Huntington's disease.

2009 Sabril®
Sabril® is launched for the treatment of epilepsy.

LUNDBECK AT A GLANCE

LUNDBECK FACTS

- H. Lundbeck A/S is an international pharmaceutical company with more than 50 years of experience in research, development, production, marketing and sale of pharmaceuticals for the treatment of diseases of the central nervous system (CNS).
- Founded in 1915 by Hans Lundbeck and listed on the NASDAQ OMX Copenhagen stock exchange in 1999.
- The Lundbeck Foundation is the largest shareholder, owning 70% of the shares. In 2009, the Foundation donated DKK 340 million for scientific research.
- Lundbeck employs more than 5,900 employees in 56 countries.
- *Revenue 2009:* DKK 13.7bn
  Profit from operations (EBIT) 2009: DKK 2.9bn
  Investment in research and development 2009: DKK 3.2bn

PRODUCTS

Cipralex® escitalopram / Lexapro® escitalopram

Approved for: **Depression and anxiety**
Revenue in 2009: DKK 7,771 million (+7%)
Partner: Forest Laboratories, Inc. (Lexapro®)

Ebixa® memantine

Approved for: **Alzheimer's disease**
Revenue in 2009: DKK 2,162 million (+15%)
Partner: Merz Pharmaceuticals GmbH

Once-Daily AZILECT® rasagiline

Approved for: **Parkinson's disease**
Revenue in 2009: DKK 769 million (+39%)
Partner: Teva Pharmaceutical Industries Ltd.

Sabril® vigabatrin

Approved for: **Epilepsy**
Revenue in 2009: Not disclosed, product launched in September 2009

Xenazine® (tetrabenazine)

Approved for: **Chorea associated with Huntington's disease**
Revenue in 2009: DKK 298 million

Other pharmaceuticals

Products approved primarily for the treatment of CNS disorders

LUNDBECK WORLDWIDE

PARENT COMPANY
Denmark

PRODUCTION
Denmark
France
Italy
Mexico

RESEARCH
Denmark
United States

SALES
Europe
Austria
Belgium
Bulgaria
Croatia
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Latvia
Lithuania
Netherlands
Norway
Poland
Portugal
Romania
Serbia and Montenegro
Slovakia
Slovenia
Spain
Sweden
Switzerland
UK

Int. Markets
Argentina
Australia
Belarus
Brazil
Canada
Chile
China (incl. Hong Kong)
Colombia
Egypt
India
Indonesia
Israel
Japan
Malaysia
Mexico
Pakistan
Philippines
Russia
Saudi Arabia
Singapore
South Africa
South Korea
Turkey
Ukraine
United Arab Emirates
Venezuela

United States

INSTITUTES
Lundbeck Institute

OUR VALUES

Imaginative – Dare to be different
Passionate – Never give up
Responsible – Do the right thing

OUR VISION AND MISSION

Vision
To become a world leader in psychiatry and neurology

Mission
To improve the quality of life for people suffering from psychiatric and neurological disorders

THE LUNDBECK INSTITUTE

- The Lundbeck Institute is an international education forum whose mission is to improve the quality of life for persons affected by psychiatric and neurological diseases.

- The Institute has an associate faculty of 82 highly respected psychiatrists and neurologists from around the world. Since it was founded in 1997, more than 4,000 specialists from 65 countries have participated in Lundbeck Institute seminars in Denmark. In addition, seminars are currently offered in 32 countries worldwide.

- The Institute's Internet community DepNet has been launched in 18 countries. It offers persons with or affected by depression the opportunity to obtain information and advice from leading psychiatrists, and to discuss their experiences with each other. www.CNSforum.com.

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