

INVENTIONS AND PATENTS

Asia takes lead in rush to monetise innovations

By Clive Cookson

Patenting has never been more popular. Applications have reached record levels at the world's main patent offices - fuelled by a sustained increase in applications from Asia. Patent filings by Chinese companies outside their home country have risen 30-fold so far this century.

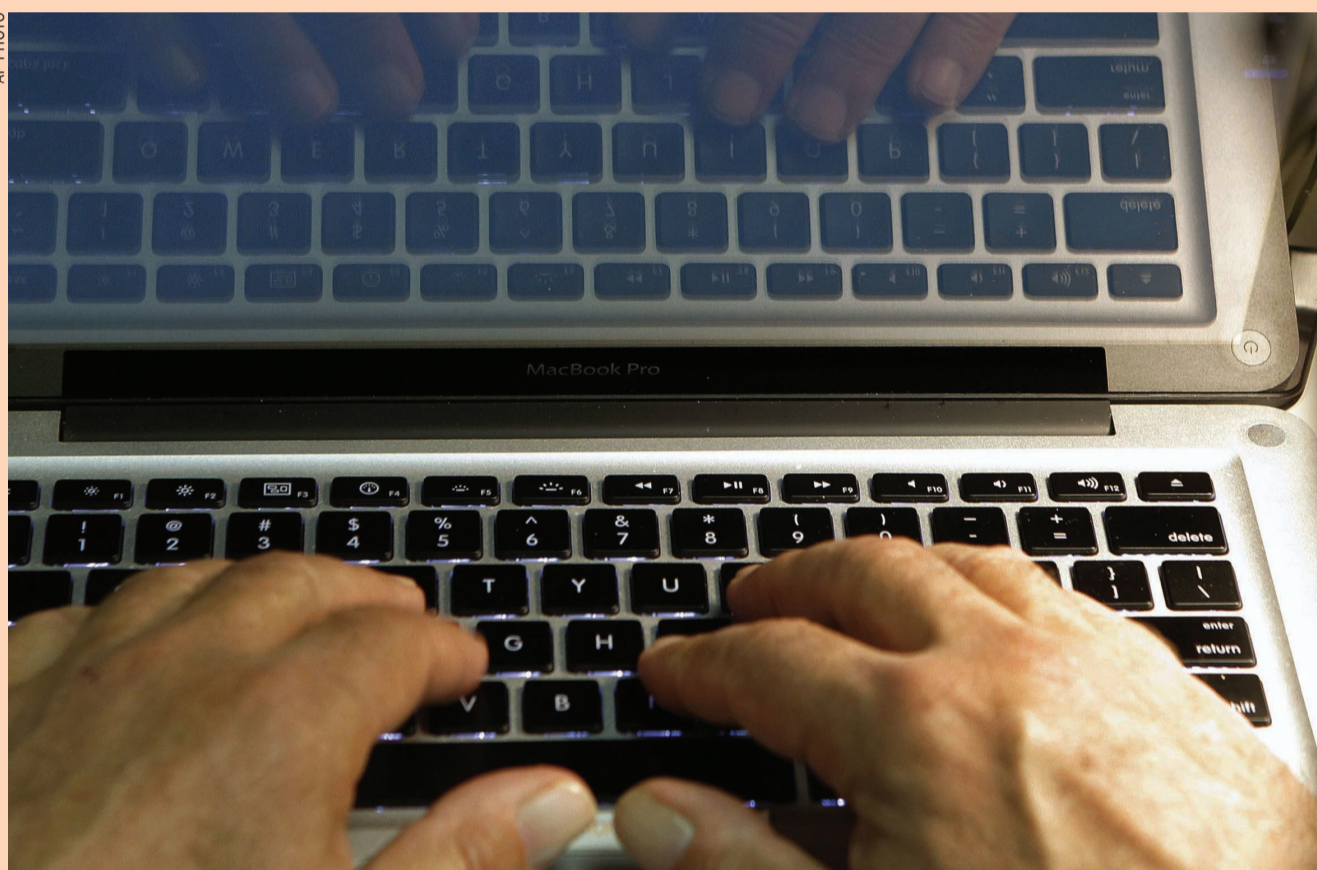
The boom is an encouraging sign for future economic growth, as companies intensify their efforts to turn the results of research into innovative products and services.

The European Patent Office (EPO) received 160,000 applications last year, up 4.8 percent on 2014. The World Intellectual Property Organisation (WIPO) reported a 1.7 percent increase to 218,000 in filings under the Patent Cooperation Treaty (PCT) which provides some international harmonisation. These numbers conceal a strong tilt towards Asia, which has more than doubled its share of PCT applications since 2005 and accounted for 43 percent of last year's global total.

Within Asia, the big story is China, which has experienced much the fastest growth in patenting of any large country since the start of this century. Although this does not come as a surprise, given the speed of Chinese industrial development, the figures are still remarkable.

Statisticians at the Organisation for Economic Co-operation and Development have analysed for the FT the geographical distribution of patents filed in the world's five most important IP offices (Europe, US, Japan, China and South Korea) - so-called IP5 patents. In 2000, just 331 IP5 applicants were based in China; this had risen to 9,767 in 2012.

"While the Chinese growth rate in patenting since 2000 does stand out, it started far behind its competitors," says Mariagrazia



Chinese patenting is not distributed evenly across different industries, with more than 85 percent of China's IP5 patents in telecommunications, computing, digital communications and audiovisual technology

Squicciarini, OECD patent specialist. Mainland China had not caught up with Taiwan by 2012 and the Asian powerhouses of Japan and Korea are still well ahead in absolute numbers. "Japan has always had a positive attitude towards IP rights embedded in its business culture," she adds. China does not have such a tradition but "there is an active policy by the Chinese government to foster patenting."

Although more recent data

guide to ownership. Further investigation is also needed on the industrial sector in which the applicant wishes to apply the patent.

"There is a shortage of good data about patenting, which has hindered analysis of innovation policies," she says. The OECD team has attempted to nail down ownership by scrutinising patent office data with the Orbis global database of 200 million private companies worldwide.

Patent filings by Chinese companies outside their home country have risen 30-fold so far this century

are available from WIPO, EPO and other offices, Ms Squicciarini says their conclusions about applicants' country of origin must be treated with caution, because names on IP documents are not a reliable

A striking feature of Chinese patenting is that it is distributed much less evenly across different fields of activity than that of other big countries. More than 85 percent of China's IP5 patents are in telecommunications,

computing, digital communications and audiovisual technology. In areas such as chemicals, pharmaceuticals and biotechnology China is hardly represented.

Most Chinese patents do not reach the international arena - and are therefore not counted in the OECD or EPO data. The vast majority are filed only domestically: WIPO's World Intellectual Property Indicators report in December showed that China's State Intellectual Property Office (SIPO) received a staggering 928,000 patent applications in 2014. It was followed by the US (579,000), Japan (326,000), Korea (210,000) and the European Patent Office (153,000). The WIPO figures indicate that Chinese inventors filed only 36,700 applications outside China in 2014 - far behind the number from the US (224,000), Japan (200,000) and Germany (106,000).

Many foreign companies are reluctant to patent in China, explains Mark Schankerman, intellectual

property expert at the London School of Economics, "because it has been almost impossible to enforce patent claims through the Chinese courts."

Prof Schankerman compares China's attitude today with that of the US in the early 19th century. "Americans were then ripping off IP from the UK because they were consumers rather than producers of technology," he says. "Now the US is in the vanguard of producers and the Chinese are like the old Americans."

The Chinese market is so big that international companies cannot afford to ignore it and increasing numbers are protecting IP in China.

Prof Schankerman predicts that Beijing will soon encourage this trend by increasing enforcement. "One reason is that it wants to encourage foreign investment, which will not come if IP is systematically stolen," he says. "The other reason is that China is moving from being a low-wage consumer to become a producer of

technology."

Analysis of different fields demonstrates an increase of IP5 patenting in most physics-based sectors such as computer technology and digital communication. Patents based on chemistry and biology are in decline, including pharmaceuticals and biotechnology.

These differences stem partly from faster technical advances and market growth in information and communications technology (ICT) than in the life sciences - and partly because of structural differences between them.

"ICT products are becoming ever more complex," says Ms Squicciarini. "To get a smartphone on the market you may need hundreds of patents. And think about the digitisation of the economy - think of all the electronics going into cars, for example."

"In 'non-complex' technologies such as pharmaceuticals very few patents are needed on a product," adds Prof Schankerman. "For a drug one patent may be enough. In contrast, complex IT products are surrounded by 'patent thickets.' Companies obtain patents to use as bargaining chips and give them freedom to operate in a field such as smartphones or computers."

Not surprisingly, the companies most active in the patenting arena are all in electronics and IT - and the top seven are based in Asia, according to the OECD's analysis of corporate patents between 2010 and 2012. General Electric of the US comes in at number eight, while the highest placed European company is Robert Bosch at 12. All are well-known household names with the exception of Taiwan's Hon Hai Precision Industry, the global electronics industry's largest contract manufacturer, which filed 3 percent of IP5 patents.

ANALYSIS | BREXIT

An ugly campaign to vilify the Turks



Turkey's President Recep Tayyip Erdogan leaves a hospital near an explosion site earlier this month, in Istanbul. Brexit campaigners contend that Turkey could be a full EU member by 2020, bringing the war in Syria to the union's borders, though skeptics say any ascension would take decades

By Philip Stephens

Flick through the campaign material of the Brexiters fighting Britain's EU referendum and you will find a video of a brawl in the Ankara parliament. Next, a poster with an image of a UK passport declaring that "Turkey (population 76m) is joining the EU?" Then statistics about Turkey's high birth rate; and a warning that Britain's National Health Service will soon be swamped by expectant Turkish mothers.

After this follows the assertion - unsubstantiated, of course - that Turkey has higher levels of criminality and gangsterism; and a map showing that Ankara's supposedly imminent accession will extend Europe's external frontier to war-ravaged Syria. None of this needs decoding. The dog whistle has made way for the klaxon. EU membership talks with Turkey, we are to understand, will soon see Britain overrun by millions of (Muslim) Turks - most of them thugs or welfare scroungers.

In the US, the Republican presidential candidate Donald Trump says all

Muslims must be treated as suspect. The Conservative Leave campaign, led by Boris Johnson and Michael Gove, has chosen to cast the entire Turkish nation as the enemy. Mr Trump plans to ban Muslims from entering the US. Britain's response to the Turkish "threat," the Brexiters say, should be to quit the EU and pull up the drawbridge.

There was always a danger that the referendum campaign would bleed into xenophobia. The UK Independence party, led by Nigel Farage, has never bothered itself with policing the boundary between legitimate debate about immigration and straightforward racism. The surprising thing has been the enthusiasm of the Tory-led Vote Leave campaign, which once presented itself as the reasoned face of Euroscepticism, in marching on to UKIP's territory.

Mr Johnson is a former mayor of London, the most cosmopolitan of the world's great cities, whose all-consuming ambition is to replace David Cameron as prime minister. Mr Gove is the minister responsible for oversight of the rule of law

in Mr Cameron's cabinet. Both had previously presented themselves as social liberals. Mr Johnson had even boasted of his family's Turkish ancestry - his paternal great-grandfather went by the name Ali Kemal Bey - and not so long ago he was a vociferous supporter of Turkey's EU entry.

Now, he represents the citizens of his ancestral home as a civilisational threat. As the Leave campaign puts it, "Murderers, terrorists and kidnapers from countries like Turkey could flock to Britain if it remains in the European Union." As repugnant as they are, Mr Trump's views on Islam are directly stated. Mr Johnson lets the Islamophobia hang in the air.

The obvious riposte is that there is no prospect of Turkey joining the EU in the foreseeable future. Mr Cameron has made just this point. Ankara first applied to join during the 1960s and opened talks with Brussels in 2005. During the past decade only one of 35 accession chapters has been completed. Each of the existing EU states holds a veto and any decision would be subject to referendums in sev-

eral that are overtly hostile to Turkey's accession. Even if, inexplicably, all those hurdles were somehow surmounted, entry would be followed by lengthy transitional arrangements. We are talking, if it ever happens, several decades from now.

Yet none of this deters Messrs Johnson and Gove from insisting, absurdly,

As repugnant as they are, Trump's views on Islam are directly stated. Johnson lets the Islamophobia hang in the air

that Turkey could be a full EU member by 2020. The Brexiters operate outside anything as old-fashioned as a framework of truth. Fiercely anti-intellectual, and borrowing heavily from Mr Trump, they judge that rational argument is best met with shameless mendacity.

They have exploited, it is fair to say, the cynicism of successive British governments in dealings with

Turkey. Mr Cameron is not the first prime minister to seek commercial and political credit in Ankara by publicly backing EU entry in the certain knowledge that others will ensure it does not happen. Germany's chancellor Angela Merkel has embraced the same unattractive realpolitik in striking a deal with

Ankara to halt the flow of Syrian refugees.

The sharp authoritarian turn of president Recep Tayyip Erdogan's government has dismayed, meanwhile, the staunchest supporters of Turkey's eventual EU accession. The avowed democrat of a decade or so ago now resides in a palace fit for Louis XIV and wants to dispense with all constraints on his personal power - another

reason why EU entry has receded from view.

The Outs, though, are not directing their fire at Mr Erdogan. Their target is the Turkish people. The crude calculation is that demonising Turks adds a useful xenophobic edge to a populist campaign against the Brussels-backing elites. The aim is to harden support for the anti-EU cause among working-class voters marginalised by globalisation. Marine Le Pen, the leader of the far-right National Front and an avowed supporter of Brexit, has done much the same in France.

The painful irony is that in "playing the Turkish card" the Outs debase the democracy they say they want to rescue from the clutches of the EU. By stoking prejudice against Turks in particular and Muslims in general, they throw away the liberal tolerance that has long defined Britishness. Mr Johnson may think that this is the way to win the referendum and then claim the keys to 10 Downing Street. But at what price?

By Henrique Almeida

Airbnb finds love in Lisbon after Berlin shies away

ON his way to work, Lisbon Mayor Fernando Medina likes to count the dwindling number of empty buildings.

Thanks to a tourism and real estate boom, many are being converted into trendy apartments that cater to the growing number of visitors to the city.

As some European cities impose restrictions on short-term rentals via websites such as Airbnb to keep housing affordable and protect residents from noisy visitors, Lisbon is taking steps to make it easier. Government measures including phasing out rent controls and selling hundreds of those empty buildings at public auctions have helped support a rebirth of the city.

"This is the first time that tourism is allowing many people to participate in the development process of the city," Medina, 43, said. "We shouldn't be scared of this new dynamic, we shouldn't be afraid of growth. On the contrary, we need to prepare the city to take in even more tourists."

While Lisbon currently requires all hosts to register their units as short-term rentals, it allows them to rent out their properties for an unlimited amount of nights per year. That's less restrictive than the 90 nights allowed in London and 60 in Amsterdam for private owners. All three cities are still more welcoming than Barcelona - which stopped giving out short-term letting permits in 2014 - and Berlin, which all but banned the practice in May for landlords who want to rent out their entire properties to tourists.

The difference between Lisbon and those cities is that the Iberian capital needs the visitors. Two years after exiting its financial bailout, unemployment is still at a staggering 12 percent and tourism is an increasingly important part of the economic recovery.

The number of nights spent by foreign tourists in the city known for its yellow trams rambling through cobblestone streets increased 21 percent in March from the same month last year. Airbnb's listings in the Lisbon metropolitan area



nearly tripled since January 2014. The boom is turning homeowners into hoteliers and actors into concierges, while lining the country's coffers with the 15 percent tax it collects on each booking.

"Portugal is one of the leaders in Europe addressing the regulation of the sharing economy," Andreu Castellano, Airbnb's public relations manager for Spain and Portugal, said in an e-mail.

Getting others to follow Lisbon's lead will be critical to Airbnb's success in Europe. The region generated about USD3 billion in revenue for its hosts last year and accounts for more than half of both the site's travelers and landlords, the San Francisco-based

company's Chief Technology Officer, Nathan Blecharczyk, said May 24 in Amsterdam. The European Commission last week issued guidance to EU countries for how to tackle the "patchwork" of rules that collaborative platforms such as Airbnb face in the bloc.

Lisbon's approach is helping people like Hugo Almeida. Two years ago, the 34-year-old moved in with his grandfather in Lisbon and began renting his one-bedroom apartment to tourists. He now makes more than 10,000 euros a year before taxes from his rental, about the same as what he earned as a butcher. He has since quit his job to learn how to be an electrician. When he's done, Almeida said he "will probably end up renovating apartments for tourists."

The boom receives its share of grumbling, of course, from locals who complain of being priced out of their neighborhood homes and of noise from visitors on different hours than those of working people going about their daily lives.

"Nobody cares about the residents, they just want to get money," said Jose Alves, one of the last original residents of a building on the foothills of Lisbon's St George's Castle, whose river view has made it a hot spot for

▲ Lisbon allows all hosts to rent out their properties for an unlimited amount of nights per year

short-term rentals. "The gentleman on the second floor died a few days ago. Let me tell you, the man's son will end up renting the apartment to tourists or selling it for a fortune."

Still, the gains for the city from the increase in real estate investment and tourists has been much greater than the drawbacks, said Mayor Medina. Tourism accounts for about 15 percent of Portugal's gross domestic product. In Lisbon, the number of guests who spend the night at hotels and other accommodations has grown at an average of 13 percent a year since 2013, according to Portugal's National Statistics Institute.

"This process creates a series of significant changes to the city," said Medina. "Most of them are positive."

It's brought more foreign investment - non-Portuguese

people accounted for 90 percent of the record 2 billion euros invested in the country's real estate last year, double the amount in 2014, according to Cushman & Wakefield in Portugal. That's helped push Lisbon property prices higher, increasing as much as 25 percent in some areas since 2013. It's also playing a role in helping Lisbon attract big conferences such as November's "The Web Summit," one of the world's biggest gatherings of start-ups.

The challenge will be in finding the balance of keeping the city authentic while welcoming the incoming cash flow, says Daniel Silva, a 32-year-old actor and model who lives in the city center. He has mixed feelings about the rise in short-term rentals in Lisbon even though he has rented out his own apartment to tourists and done check-ins for friends.

The bakery where he works is finding the balance, delicately. "Our non-Portuguese clients, who represent more than half of our customers, feel that paying one euro for a custard cake is ridiculously low," said Silva. Still management decided not to raise the prices because it would make it difficult for locals to afford them. "What would become of a Portuguese city without any Portuguese?" Bloomberg



BLOOMBERG

High waves during storm? New forecast model tries to predict

By Martha Waggoner in Raleigh

WHEN John Couch is certain a storm will hit Hatteras Island, he goes into action, moving merchandise in his auto parts store from bottom shelves to top ones and hauling away the most valuable items.

But at 64 years old, Couch is less and less enamored of spending eight hours packing up his property. So his ears perked up when he learned about a new forecasting model from the U.S. Geological Survey and the National Oceanic and Atmospheric Association that's intended to give a better idea of how much ocean water will overrun an area.

"Any and all information is always helpful," says Couch, who owns the Lighthouse Service Center and Lighthouse Auto Parts along North Carolina's Outer Banks. "You don't want to put up stuff unless you really have to."

The USGS is running its coastal change forecast model to predict how far a storm's waves will push water up the beach — whether it will go just to the dunes, over the dunes, or even farther onto roads



A flooded road on Hatteras Island, N.C., after Hurricane Irene swept through the area the previous day cutting the roadway in five locations

and property. Oceanographers are in the pilot stages of a new implementation of the model that would predict beach changes in all weather conditions.

As part of the pilot program, hour-by-hour forecasts of potential beachfront changes caused by wave conditions are underway in some areas of North Carolina, Massachusetts and Florida, said USGS research oceanographer Hilary Stockdon. The pilot program runs all the time for all sorts of weather, not just big storms such as hurricanes and nor'easters. Eventually, the forecasts — which give details for the coming days — will be available for all Gulf and Atlantic states up to

102 hours before storms.

The pilot program was running in North Carolina during recent Tropical Storms Bonnie and Colin, but the forecasts aren't yet available publicly. Officials hope the information for the three states will be online in three months.

"In places like the Outer Banks, there could be a high tide and winds from a particular direction that are going to overwash Highway 12 and cut off transportation," Stockdon said, referring to the narrow road that provides the only nonferry access to Hatteras Island. "Those are the kind of events we want to be able to help locals with."

Since 2011, the model has been used to forecast coastal change during storms that make landfall. USGS used it most recently when Colin made landfall in Florida; researchers are studying the results to determine the accuracy of their forecasts. Those are available to the public through the USGS coastal change hazards portal.

The model adds data about what's called wave run-up to information on storm surge and tides. That results in a total on the amount of water that will come ashore in any kind of storm, said USGS research oceanographer Joseph Long. Storm surge measures how high the ocean will rise; wave run-up determines how big the waves will be at the shoreline, on top of the rising ocean.

"It's the addition of the two," he said. "They're both important. In the past the forecasts have only given us the storm surge. [...] A lot of times, they're equally important."

The new model could save lives on vulnerable barrier islands such as the Outer Banks by advising residents of when escape routes might be cut off, said Jeff Masters, meteorology director of the private

Weather Underground.

For example, Masters wrote in an email, during Hurricane Ike in 2008, residents of Texas' Bolivar Peninsula had their only route cut off nearly 24 hours before the storm arrived. Seven people died on the peninsula from storm surge — several while attempting to escape, he said.

Last fall, Hurricane Joaquin stayed well to the east of the Outer Banks. Yet the USGS model accurately forecast dune erosion that occurred in Duck and over wash on a road in Kitty Hawk, Long said.

"Water levels got pretty high, but there wasn't a big surge," he said. "That's the kind of event you would miss if you're only forecasting storm surge."

The USGS uses a camera that takes before and after photos at the Army Corps of Engineers field station in Duck to check the accuracy of its forecasts. Officials also want to install cameras on the northeast coast of Massachusetts; in Jupiter, Florida; and on the Gulf of Mexico at Tampa Bay.

On the Outer Banks, Dare County didn't issue a mandatory evacuation before Sandy struck in 2012, buckling part of N.C. Highway 12. Drew Pearson, now emergency management director for the county, said, "This product may have told us what we were going to get, and we may have been able to make a different decision." AP

ASK THE VET

By Dr Ruan Du Toit Bester



CUSHING'S DISEASE IN DOGS - TREATMENT AND DIET SUGGESTIONS

CUSHING'S disease (Hyperadrenocorticism) is probably more accurately referred to as hyperadrenocorticism -- the production of too much adrenal hormone, in particular corticosteroids. It can be naturally occurring or due to over administration of corticosteroids such as prednisone (iatrogenic Cushing's). The latter is easy to cure - just cut out the corticosteroid administration slowly to allow the body to return to normal function. The former is more difficult.

Hyperadrenocorticism occurs for two reasons, a tumor of the adrenal gland that produces adrenal hormones or stimulation of the normal adrenal glands from the hormones that control it. The primary reason for this to occur is a pituitary gland tumor that produces excessive ACTH, which stimulates the adrenal gland to produce corticosteroids. Adrenal gland tumors account for 15 percent of the cases of spontaneous hyperadrenocorticism. Pituitary tumors account for 85 percent.

Cushing's disease causes increased drinking, increased urination, increased appetite, panting, high blood pressure, hair loss - usually evenly distributed on both sides of the body, pendulous abdomen, thinning of the skin, calcified lumps in the skin, susceptibility to skin infections and diabetes, weakening of the heart and skeletal muscles, nervous system disease and other symptoms. Most owners reach a point where the water consumption and urination become bothersome to them.

The diagnosis of Cushing's can be done with several blood tests. A general hint of Cushing's can be obtained by a blood panel. To confirm it, a test known as a low dose dexamethasone test is done. A baseline blood sample is drawn in the morning, an injection of dexamethasone given and a follow-up blood test done 8 hours later. In a normal dog, the dexamethasone should suppress cortisol levels in the blood stream. In Cushing's disease this effect does not occur. Once the disease is diagnosed, it is possible to differentiate between the adrenal tumors and pituitary gland tumors using a second test, a high dose dexamethasone suppression test. Most dogs with pituitary tumors will have cortisol suppression on this test. There are other tests used, including ACTH response tests and urine cortisol/creatinine ratios to diagnose this disease. X-rays and ultrasonography can help determine if an adrenal gland tumor is present.

If it can be determined that there is an adrenal gland tumor, it can be removed. Many veterinarians prefer to have a specialist attempt this since the surgical risks can be high. Pituitary gland tumors are not usually removed in veterinary medicine. This situation is treated using Lysodren (o'p'-DDD, which is a relative of DDT) or ketaconazole. Lysodren selectively kills the outer layer of the adrenal gland that produces corticosteroids. By administering it in proper amounts it is possible to kill just enough of the gland

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What is Cushing's Disease?

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off to keep the production of corticosteroids to normal levels. Obviously, close regulation of this using blood testing is necessary since overdoing it can cause severe problems with Addison's disease - hypoadrenocorticism. Adverse reactions to Lysodren occur at times but it is the standard treatment at this time. Over medication with Lysodren can cause inappetence, vomiting, diarrhea, lethargy and weakness. If any of these signs occur then your veterinarian should be immediately notified.

Treatment of Cushing's disease caused by pituitary tumors is symptomatic therapy - it does not cure the pituitary tumor. The average lifespan of dogs diagnosed with Cushing's, with or without treatment is estimated at 2 years, but in a recent conversation with another endocrinologist I came

away with the impression that this was an "educated guess" rather than the result of extensive survey of Cushing's patients. At present, though, I think that treatment should be viewed as a means of providing a better quality lifestyle rather than as a method of extending longevity.

Hope this info helps
Till next week
Dr Ruan

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