

US-China: High-tech diplomacy

By Geoff Dyer and Richard Waters

As Xi Jinping prepares for a state visit, the White House is seeking to punish Chinese companies that steal trade secrets. But China's president has other ways of showing his clout with corporate America.

When former Chinese president Hu Jintao visited the US in 2006, his first stop was a Boeing plant in Seattle. After his speech, one of the factory workers gave Mr Hu a bear hug and placed a Boeing baseball cap on his head. As the crowd stood to applaud, Alan Mulally, then chief executive of the company's airline division, pumped his fist in the air and shouted: "China rocks!"

Nearly a decade later, China's current president Xi Jinping will also kick-off a US visit later this month in Seattle, which will include private sit-down with some of the luminaries of the US tech industry. A dozen CEOs - including Apple's Tim Cook and IBM's Ginni Rometty - have been invited to meet the Chinese leader in a session hosted by Microsoft co-founder Bill Gates. The heads of some of China's own internet leaders such as Alibaba and Baidu will also attend.

Yet Mr Xi will find himself in a very different and more charged political atmosphere. The meeting with American tech executives is fraught with political symbolism because it will take place as Washington and Beijing are at loggerheads over many issues central to 21st century capitalism - cyber crime, intellectual property rights, spying, market access and governance of the internet.

With two weeks to go before Mr Xi's state visit to the US, the Obama administration is considering imposing cyber-sanctions on Chinese companies it believes have stolen American trade secrets. Beijing, meanwhile, is eager to show off its close ties with America's leading tech firms. And although some US companies are delighted for the chance to build direct relations with China's leader, others have viewed the invitation to meet Mr Xi as - according to one executive - "not far short of a summons" from the Chinese.

The Seattle meeting is the sort of encounter that a Chinese



A TV screen shows Edward Snowden. After his revelations, China redoubled efforts to build its own IT and communications

leader would typically seek to arrange, but the meeting has taken on major political significance given the debate in the administration about cyber-sanctions. "I think he's trying to insult the US government," says one US technology executive.

Mr Xi's trip to the US, which will include a formal state visit on September 25, would already have been a delicate exercise given the tensions over the South China Sea and an election campaign already brimming with anti-Beijing rhetoric. The sparring over tech sanctions gives the visit an extra edge.

The American business community once saw itself as almost a go-between in the US-China relationship, an embodiment of the two countries' intertwined economic fates and a diplomatic actor that was sometimes able to take the edge off political arguments.

Yet globalization and geopolitics have become more sharply tangled over the past decade and American business has found itself in the middle of the growing rivalry between the world's two biggest economies.

Nowhere is this more true than for the technology industry. US companies are unhappy at China's plans to muscle important concessions, such as access to new technologies, in return for access to its vast market. For years, the US tech industry has complained about attempts by

Chinese hackers to steal intellectual property. But the companies are also still bristling from the Edward Snowden revelations about US government spying that compromised trust with their customers. The meeting with Mr Xi brings the tech industry even closer to the political fray.

government suggested that only companies with locally-developed technologies would be able to bid for public procurement contracts.

The feeling that China was starting to become a more hostile place for US companies was exacerbated in 2010 when Google

Xi Jinping will kick off a US visit later this month in Seattle, which will include private sit down with some of the luminaries of the US tech industry

"The tech companies are being pulled in many directions by both governments in what has become a much more complicated relationship," says Adam Segal, an expert on Chinese technology policy at the Council on Foreign Relations. "Most of them do not like being caught in the middle."

The American business community's relationship with China started to change in 2006, when Beijing first outlined its ideas about "indigenous innovation" - a plan to make the country less dependent on foreign technology. Those concerns accelerated in 2009, when the

shut down its search operations in the country after falling victim to sophisticated hacking and censorship.

Rather than seeing themselves as a conduit between the governments, US companies started to lean more heavily on Washington for support against Chinese policies that seemed designed either to shut them out of large sections of the Chinese market or pressure them to hand over key technologies.

More recently, Microsoft has run into trouble in China. Last year, its offices were raided by government investigators and Windows 8 was banned from

government computers amid claims in China that it could be used by the US government to steal private data.

However, corporate America's frustrations with Beijing have not translated into enthusiastic support for the Obama administration's campaign against what it calls Chinese "cyber theft".

Since 2013, the US government has tried to increase the pressure on Beijing to curtail its use of military and other hackers to steal the trade secrets of American companies. Last year, the US Justice Department issued indictments against five PLA officers for hacking American businesses, including Westinghouse and US Steel. In recent days, administration officials have raised the prospect of going a step further and imposing sanctions on companies or individuals involved in cyber theft. Some officials say the first sanctions could come before Mr Xi's visit.

Many of the big tech companies were angry at the cyber-indictments last year because they feared they would be the obvious targets of retaliation. The possibility of sanctions ahead of the Xi visit is, according to some in the industry, an even more needless provocation.

It is amid these conflicting and swirling political agendas that Mr Xi will meet executives from the industry. The expected attendees include the CEOs of Apple, Microsoft and IBM, and Cisco chairman John Chambers. Mark Zuckerberg, the Facebook founder whose company is banned in China but who has been earnestly learning Mandarin, has been invited but has not decided yet whether to attend.

Parallel to Mr Xi's Seattle visit, the US China Internet Industry Forum is holding its regular conference, which could give the encounters between industry executives and the Chinese leader an aura of 'business as usual'. However such a high-profile meeting with US companies also sends a clear message about Chinese political clout. A Washington-based industry executive said that the US companies were not comfortable with the impression they are being used by the Chinese government, but they also did not want to snub Mr Xi.

The meeting with Mr Xi comes as a number of US companies are beginning to show signs that

they are willing to accommodate some of Beijing's demands over access to the Chinese market, whether they include censorship or technology transfers.

"He wants to build his own industries," an executive says of Mr Xi's determination to pursue the "indigenous innovation" strategy. "Yet the opportunities for some of these companies in the near term are huge."

Apple is the standout success story, with sales of the iPhone rising 75 per cent in China over the past year.

"China used to give [Apple] a hard time," says a tech executive. "Now they are manufacturing so much more there, and they've been very accommodating with the mobile industry."

After the Snowden revelations, China redoubled efforts to build its own IT and communications infrastructure, hurting sales of companies such as IBM and Cisco. IBM has since changed its strategy, opening up its server technology for Chinese companies to build their own hardware rather than trying to sell all its own gear. Qualcomm, the mobile chip company, recently settled an antitrust case in China by agreeing to slash its royalty rates to Chinese manufacturers.

Now Google is also looking to return to China. It has been seeking approval for a Chinese version of its Play store - its portal for Android apps and games - according to people familiar with its plans. A censored version of the store, stripped of whole categories of apps that might offend, would give Google a way to tap into the huge "unofficial" market of Android phones in the country.

A limited app store might also be a more palatable way of bowing to censorship than reintroducing a search service in which it was once forced to strip out results query by query. If Google finds a way back, it will be an important signal that US tech companies are prepared to make concessions to China.

"Android is powering a lot of innovation in China," Sundar Pichai, a senior Google executive told Forbes. "That's important to me. It would be a privilege to serve Chinese users."

FT BIG READ

Automobiles - Time to accelerate

By Andy Sharman and Richard Waters

Elon Musk's ambition has pushed Tesla's value into the stratosphere. But as it prepares to release its much-delayed Model X, critics say it has not evolved quickly enough from tech start-up to carmaker.

All it took was five seconds of silence. Elon Musk, the chief executive of Tesla Motors, was asked during a conference call whether his electric car company would move into ride-sharing services, turning it into a potential challenger for taxi app Uber.

Mr Musk, one of the world's great PR men, paused. Then he refused to answer.

The tactical swerve was a new trick for the techno-utopian, known for enthraling the media and investors with his explosive talk of disrupting entire industries and his market-moving tweets.

"Have you ever heard Elon Musk punt on a strategic question before?" says Adam Jonas, the Morgan Stanley analyst who posed the question.

Two weeks later, on August 17, Mr Jonas raised his share price target for Tesla to USD465 - almost twice the current level - and laid out his belief that the company would soon launch "Tesla Mobility", a new business line in shared, self-driving cars that would triple the company's revenues by 2029.

Thus another layer of expectation was added to what is already one of the world's most hyped companies. But well before Mr Musk sets his sights on yet another business to upend, he has a more pressing task: shipping Tesla's much-delayed third car. That is supposed to happen later this month, when the company is expected to release the Model X, a sport util-



The charging cable is attached to one of the Tesla Model S vehicles

ity vehicle with eye-catching "falcon-wing" doors and an expected starting price of \$90,000.

Even if the Model X is a hit, Tesla's stratospheric valuation - almost \$1m for each car it sold last year - demands an even higher level of ambition.

Mr Musk's vision has Tesla becoming not just a maker of niche, cool, expensive cars beloved by Californians, but a mass-market producer of electric vehicles that are long-range, affordable and stylish. At the same time, it will use its battery technology to build a complementary business of selling power storage units for homes and businesses.

Both goals hinge on the success of a 1,000-acre, \$5bn lithium ion battery factory under construction in the Nevada desert, known as the Gigafactory, that Tesla says will help drive down costs.

Unless you are a traditional carmaker, the Musk vision is thrilling. Tesla bulls hail Mr Musk as the next Henry Ford - or "Steve Jobs with a South African accent", as one business school professor puts it. The bears say Tesla has not made the leap from tech start-up to car company.

"The risks of what Tesla is doing are extraordinary," says Max Warburton, a respected car industry analyst. "It's not only the most vertically integrated tech company you've ever seen. It's

also the most vertically integrated car company since Ford in the 1920s."

The US's youngest listed carmaker has achieved remarkable feats in its 12 years. The Model S, launched in 2012 and Tesla's second product after a two-seater sports car, is good. So good, in fact, that the latest version received a record rating from Consumer Reports in the US:

“Our mission is fundamentally to transition the world to electric cars”

ELON MUSK

103 points out of a possible 100. The magazine called the saloon an "automotive milestone" and the best car it had ever reviewed.

But Tesla's finances are a more challenging proposition. By the end of last year, it had spent \$3.3bn on capital expenditure and research and development - or \$40,000 per car sold so far - according to FT research. It is burning cash at an increasing rate; in the first six months of this year it spent \$760m.

Cash flow problems are nothing new. Before the Palo Alto-based company became an "it" stock, it was charted by a blog called "Tesla Death Watch".

The company has come close to bankruptcy on several occasions - only to find that next cash injection at the eleventh hour.

"Money has always arrived at the right time - probably because Elon Musk has been able to inspire people at the right time," says Paul Nieuwenhuis of the Centre for Automotive Industry Research at Cardiff Business School.

More money arrived last month when the company sold 3.1m shares to raise \$740m. That is just the start of what it will need. Tesla is expected to sell as many as 55,000 cars this year, about a quarter of Porsche's annual sales. But Mr Musk, who is Tesla's biggest shareholder with a stake of 22 per cent, wants the company to achieve annual sales of 500,000 cars by 2020.

At the Detroit motor show in January, he said the company was capable of selling BMW-style volumes of "a few million" cars by 2025. "Our mission is fundamentally to transition the world to electric cars," he said.

"So if we don't make a lot of cars, we're not doing the best that we can." Tesla's mass-market offering, called the Model 3, is due to start production in about two years and sell for \$35,000. That is half the list price of a Model S, and not far off the average price of a new car in the US.

Tesla expects to spend \$1.5bn in capital expenditure this year. Mr Jonas forecasts a total of \$14.4bn in capex and R&D costs between this year and 2020, for another plant, tooling and the Gigafactory. "And I'm prepared for more," he says. It sounds hefty, but that is only about half Tesla's current market capitalisation spent over five years. Ford, by contrast, spends the equivalent of its entire market value over a similar period.

But that comparison relies on the Tesla shares staying up. The stock price is riding high - up about a third since a tweet from Mr Musk flagging the energy storage business. But some market watchers worry the feel-good sentiment has got ahead of itself and pushed the sceptics to the sidelines.

"This creates an imbalance where only the bullish sentiments get expressed in the market," says Brian Johnson, an analyst at Barclays.

"Do I want to be short when they release the sketches of the Model 3 and host the press conference?"

Tesla bears similarities with every company Mr Musk, a South African-born serial entrepreneur, has helped to start.

From Zip 2, his first internet venture, to X.com, the financial technology company that became PayPal, his companies are characterized by dreams of turning entire industries on their heads, relentless work demands and optimistic deadlines.

"Big vision, big balls, big bets,

big claims... It's very much his hallmark way of operating," says a former employee.

In some ways, this works to good effect. A current Tesla supplier recounts how a problem was discovered on a Friday. Mr Musk demanded the engineers work over the weekend, issue hourly updates and have the problem fixed by Monday. "If it was Ford, you've got labour unions. This would have taken two years," says the supplier. "Elon's not bound by traditional business models. He looks at the world as limitless."

But this can also cause problems. The Model X was meant to start production in 2013, but is only now inching over the finish line. That is fine if you are a maker of niche premium electric cars, and, as one industry chief executive puts it, "as long as it's a knockout and you've got the cash flow to sustain it".

But Tesla's record of missed deadlines could be exposed by mass-market volumes and the challenges of running a multi-car company. Tesla has said lower deliveries of the Model X this year could mean it will miss a year-end target for becoming free cash flow-positive. Analysts say the cash produced by the current business could fall well short of paying for the new-generation Model 3.

As it embarks on the next phase of its expansion, Mr Musk's ability to sustain Wall Street's confidence has become essential to the company's chances of success. "He's a fabulous promoter. He's held the stock price up remarkably well given the finances of the company," says Jeffrey Pfeffer at Stanford Graduate School of Business.

The lofty share price is now one of Tesla's most important assets, opening the way to raising the massive amounts that will be needed without diluting existing investors excessively.

But Mr Musk may have set the stage for a sharper reversal if and when the stock price starts to slip: he has used some of his own stock in the company as security to borrow from a number of banks (when a figure was last disclosed, a year ago, he had borrowed \$275m from just Goldman Sachs). If the stock price falls, Mr Musk might be forced to sell to cover his loans, adding to downward pressure on the stock, according to the company's official filings.

The 44-year-old has also represented a sometimes controversial figure at the centre of Tesla's fortunes. Both loved and feared by employees, he inspires intense loyalty while at the same time handing ammunition to the doubters with his more far-fetched ambitions.

'Watching like a hawk'

Few would doubt that Tesla has shaken one of the world's biggest industries with its unusual approach - no advertising, no franchised dealerships, no discounting - despite industry executives who claim in public that it is not a serious rival.

"There's nobody out there at a senior level that thinks Tesla isn't serious," says an adviser to the leading carmakers. "They know this is a business hell-bent on disruption, and they're watching it like a hawk."

Tesla has distinct advantages in electric cars over its auto industry rivals, who have billions invested in the internal combustion engine. But few think the company can carry off its approach in the mass-market, partly because of its vertical integration.

Tesla is trying to reverse an outsourcing trend that has been at play in the industry for three decades or more. Volkswagen and Toyota rely on suppliers for around 75 per cent of their cars. But

Tesla builds many of its parts in-house. That brings control, but also adds devilish complexity, and contrasts with other start-ups.

Tesla's vertical integration extends to the job of refuelling its cars. It is trying to address the dreaded "range anxiety" by building a network of free-to-use superchargers that make it possible to drive from Mountain View to Massachusetts in the US, Manchester to Rome in Europe and across major cities in China.

The company's 200-or-so stores, many of them in shopping malls, could struggle to support annual sales of 500,000, meaning the company may have to embrace franchised dealers.

This ambition and integration is slowing Tesla down just as the auto industry is stirring, critics say. "You can't go this slowly at a time when the competition has stripped down the car, worked out the battery and are preparing to serve up rivals," says Mr Warburton.

This week's Frankfurt motor show will reveal the industry's deeper commitment to electric vehicles, not least in the shape of an Audi SUV concept car capable of 310 miles on battery power. Other rivals - such as General Motors with its 200-mile car due in 2018 - are also preparing their move into mass-market electric vehicles.

But Tesla's real competition may not be the mighty German carmakers or the Americans 2,000 miles away in Detroit.

It could just as well be near neighbours - Google, Apple and Uber, which are already engaged in a war for the best automotive talent. The car industry is hurtling towards new, uncertain fields of competing fuel sources, autonomous technologies and business models. And the tech giants want in. The result is likely to be a war of competing technologies as the new entrants fight to supplant the internal combustion engine.

The world's biggest automaker, Toyota, has put its faith in hydrogen technol-

ogy - dismissed by Mr Musk as "fool cells". But even the Tesla battery has not become the standard. Rivals extol the virtues of other battery technologies, such as sodium-ion. Tesla could find itself marginalised if it turns out to have backed the wrong horse.

"This is where the platform standards and dynamics come in, since every major automaker will have [electric vehicles] fairly soon, if they don't already," says Michael Cusumano, a professor of management at MIT's Sloan School of Management.

Tesla's success will depend in part on which platforms win out. Either it establishes the blueprint for lithium-powered vehicles - perhaps even shared ones - or it could go the way of another car company with fancy doors. "My guess is that there is so much cash and hype behind Tesla that it will survive for a decade, and then run out of cash," says Mr Cusumano. "Reminds me of DeLorean's venture."

By Kirsten Grieshaber in Berlin

THE Syrian family asks with wonder why they didn't die like thousands of others like them: killed by bombs in their native Damascus; drowned by the rough waves of the Mediterranean; or suffocated in overcrowded trucks speeding them through Europe.

"Sometimes I wake up and I feel like, thank God, I'm alive," says 19-year-old Reem Habashieh, who with her loved-ones survived a harrowing 16-day flight from Syria to arrive last week in Berlin — amazed they all made it. "I'm lucky, I'm a blessed person."

Habashieh, her mother and three younger siblings are five of the 37,000 who have flooded into Germany this month. Now they're embarking on another unknown journey, trying to start a new life in a country full of strange people, cold rain, unfamiliar smells and voices they don't understand.

Fear still fills Habashieh's big green-brown eyes when she recounts their epic trek across Europe last month.

"We had to hide between the trees, run through sunflower and cornfields and walk all night," Habashieh says, tucking in a loose tail of her gray woolen hijab. "There were scary animals, people were mean, we had to sleep under the sky — it was very dangerous."

But excitement and youthful curiosity shine through as she describes her family's arrival in Berlin — how she led her family on buses, subways and commuter trains through the capital, and organized essential first steps like registering to apply for asylum.

Raghad, Reem's 11-year-old sister, a skinny girl with long brown hair and a big cheeky smile, got so tired along the way that Mohammed, her burly 17-year-old brother, sometimes had to carry her for hours.

Yaman, a lanky 15-year-old, dragged his feet on his own. He doesn't talk much, seemingly still processing the experiences of the past weeks.

Khawla Kareem, their 44-year-old mother, says she's still exhausted from the odyssey, but that her maternal urge to bring her four children to safety filled her with the power she needed. Her husband died three years ago; being left alone to care for the children amid a brutal civil war led her to the difficult decision of leaving everything behind and fleeing Syria.

It was also three years ago that the war hit home, as the front line between President Bashar Assad's Syrian army and the rebel Free Syrian Army came to the Damascus street they lived on — and they were literally caught in the crossfire.

"They kept fighting, bombs were falling, our house bur-



In this photo taken on Tuesday, Sept. 8, from left, Syrian refugees Yaman Habashieh, Reem Habashieh, Khawla Kreem, Mohammed Habashieh and Raghad Habashieh, in front, pose for a photo in at the central registration center for refugees and asylum seekers in Berlin

Damascus to Berlin; a Syrian family's escape to new life

ned once, we rebuilt it," Reem Habashieh, who studied economics at the university of Damascus, recounts in fluent English. "We were just saying that we are strong and that we can keep it on in Syria — but we can't anymore."

She remembers how life during the war simply stopped for them.

"Somehow you're just sitting there, you don't know anything about tomorrow, you don't know if you are going to be alive."

So earlier this year Khawla Kareem, an elementary school teacher, scraped together 12,000 euros (USD13,400), selling the family car, and bought plane tickets to Bodrum on the Mediterranean Coast in Turkey. She paid traffickers to take them across the sea in a small rubber boat to the Greek island of Samos. Moments before they boarded, the smugglers told them to leave behind all of their belongings on the beach — laptops, clothes and precious objects carrying memories of their past life.

They took a ferry from Samos to Athens, then worked their way through Macedonia and Serbia into Hungary, where the mother hired another human smuggler. He spirited them across borders on his minibus with dark tinted windows and north to Berlin, dropping them off on the outskirts of the city last week.

Germany has said it expects

some 800,000 migrants this year, and the government has said refugees from wars like Syria's can count on having their asylum requests fast-tracked. Others, like migrants from Serbia, Kosovo or Romania, will likely be returned to their home countries, which Germany considers secure.

“There were scary animals, people were mean, we had to sleep under the sky — it was very dangerous”

REEM HABASHIEH

Challenges abound even for those, like the Hasbashiehs, who get to stay.

For five days, they have been standing in line, squeezed together with hundreds of other refugees outside the central registration point for asylum seekers in the German capital.

In the queue is a cross section of those who have shared their plight in recent weeks: young mothers hugging sick babies; a Syrian army defector wonde-

ring whether he should tell the truth about his military past; lonely, unattended teenage boys whose eyes are still filled with the terror they've been through.

They crowd under the maple trees on the city office's dusty compound, pushing and shoving in one big line that slowly snakes its way into the gray high-rise building.

Some are from Syria, Iraq and Afghanistan, others from Eritrea and Sudan and still others from Albania, Montenegro, Kosovo and elsewhere. All came for a better life in Germany.

Their most important belonging right now is their "magic number" which will allow them to enter the building and finally register to file their application — when it's eventually called.

The Habashiehs have been holding on to a small blue ticket numbered T00140 for five days, watching in vain so far for it to flash up on the black screen.

Some in line say they've been waiting two or three weeks for the overwhelmed German officials to finally attend to them.

Meanwhile, city and community officials have been working overtime and on weekends, and pensioners have come out of retirement to help process all the newly arrived migrants.

Residents also have come out in droves as the scene repeats itself around the country, bringing those in line food and drinks, donating toys and clothes and sometimes offering

rooms in their private homes.

After the adrenaline-charged escape from Syria and nearly 4,000-kilometer journey, the slow bureaucracy now seems to take forever for the Habashiehs.

They have been lucky to get a room of their own in a former army barracks in Berlin's western Spandau neighborhood, where they were put up with 1,600 other new arrivals.

Had they arrived just a few days later, they would have had to make do with cots under unheated white tents.

Until their asylum application is officially submitted, it's hard to think ahead, not knowing whether they will stay in Berlin or be relocated elsewhere in Germany.

"We want to start our new lives, Raghad and Yaman want to go back to school, I really want to learn the new language," Reem Habashieh says a little impatiently. She dreams of becoming a student at one of Berlin's universities; her brother Mohammed wants to study information technology, then leave to work in one of the Arab gulf states.

Only their mother is a bit more cautious. She is relieved she managed to bring her family to Germany, saying it's "a welcoming and helpful country for refugees and they respect the hijab and Islam here."

But she pauses for a moment and then says quietly, "my heart will always be in Damascus." **AP**

Forest-fire haze harming air quality in Indonesia, Singapore



Tourists take souvenir photographs in front of the Petronas Twin Towers covered by haze in Kuala Lumpur

By Rieka Rahadiana

SMOG caused by slash-and-burn agriculture in Indonesia is continuing to foul air quality as far away as Singapore, with readings in some parts of Sumatra island deemed “very unhealthy.”

The haze, caused by farmers who burn forests to clear their land for agriculture, is an an-

nual occurrence that sends smog wafting northward to Singapore and Malaysia. Those governments have complained to Indonesia, and Singaporean legislators last year passed a law allowing regulators to prosecute companies involved in illegal forest burning.

Air pollution was deemed “moderate” last week in both Pekanbaru in Riau province and

Medan in northern Sumatra. The agency illustrates its readings with emoticons showing a crying face for unhealthy levels, a deeply frowning face for very unhealthy levels or a deeply frowning, squinting face for a hazardous reading.

The Indonesian military said in an e-mailed statement that it was sending as many as 1,059 army, marine and air force personnel to South Sumatra to fight the forest fires. Singapore also offered to send help and has placed a C-130 plane on standby for cloud seeding, as well as other aircraft.

In Singapore, the Pollutant Standards Index showed a three-hour reading of 187, edging closer to the “very unhealthy” range exceeding 200. It’s still far below the record of 401 set in June 2013. Any PSI reading above 100 is classified as unhealthy.

The fires are exacerbated by the local dry season. Indonesian authorities warned last week that this year’s haze will be worse than in previous years, the Bernama news agency reported, and could last through end-November. **Bloomberg**



ASK THE VET

by Dr Ruan Du Toit Bester



NATURAL IMMUNE SYSTEM BOOSTERS FOR DOGS

IMMUNE system boosters may be recommended for diseased or recovering pets, but these can be administered to all dogs, as the immune system can keep diseases at bay and ensure a better health condition for the pets. Natural immune system boosters have numerous benefits over the synthetic supplements, containing substances that are found in plants or herbs.

THE IMMUNE SYSTEM IN CANINES

The immune system in canines is a complex structure that is made up of several cells and organs and plays the role of defending the dog’s body against various infections, toxins and parasites. If the immune system is weak, the dog is exposed to diseases and the body will not be able to respond to the attack. Consequently, it’s important to keep all components of the immune system healthy and provide boosters when needed.

The immune system is made up of:

- The skin, which stops many bacteria and toxins from entering the dog’s system, containing also a few immune cells and producing antibacterial matter, which will play an important role in defending the pet
- Tears, saliva and other secretions that contain enzymes that protect against in-

fectious agents

- The lining of the respiratory, gastrointestinal and genital tracts will also protect the body
- The lymphatic system
- Bone marrow
- The spleen
- The antibodies
- White blood cells

IMMUNE SYSTEM PROBLEMS

The immune system can weaken due to:

- Allergies, which will activate certain antibodies
- Diseases and infections
- Autoimmune conditions
- Surgeries or trauma
- The administration of various medications such as corticosteroids or antibiotics

NATURAL IMMUNE SYSTEM BOOSTERS

Natural immune system boosters may be administered to dogs that have a medical problem and require a strong immune system or simply to maintain the immune system strong and prevent any infections and diseases.

Herbs can be used to boost the immune system and keep diseases at bay, without having any negative effects as other types of medication. The most



commonly herbs used to improve immunity in dogs include:

- Dandelion (*Taraxacum officinalis*), which contains various vitamins and minerals such as A, B, C and D, iron, zinc, magnesium, lecithin or potassium
- Echinacea is a natural antibacterial, antifungal and antiviral solution
- Ginger root
- Withania somnifera (Ashwagandha)
- Burdock root, which has effects similar to steroids, but none of the side effects
- Green tea, which is an antioxidant

These herbs may be used in the form of tinctures that can be added to the dog’s meals or applied on the dog’s skin, to provide protection. Teas may also be prepared and served cold instead of the

dog’s regular water.

Other natural ingredients used in dogs with weak immune systems include:

- Fish oil, which contain numerous fatty acids that have various benefits for the immune system

Hope this helps
Till next week
Dr Ruan

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