suggest that wolves ever lived in southern China, “so how do you domesticate a wolf if there aren’t any?” And Jean-Denis Vigne, an archaeozoologist at the National Museum of Natural History in Paris, agrees, noting that in earlier work, Zhang’s team “completely ignored what has been published, even in the frame of genetics”.

Peter Savolainen, a geneticist at the KTH Royal Institute of Technology in Solna, Sweden, who co-authored the *Nature Communications* paper, argues that Chinese scientific literature suggests that wolves did once live south of China’s Yangtze River, but have since become extinct. But he acknowledges that the date that his team reported — like all molecular dating efforts — relies on several assumptions, such as the number of genetic mutations that develop in each generation.

A third paper³ argues that a more probable date for domestication was 11,000–16,000 years ago. Posted to the arXiv preprint server on 31 May, the study, like Zhang’s, compares the whole genomes of wolves and dogs. But the paper paints an even murkier picture, suggesting that wolves and the ancestors of modern dogs continued to breed together long after domestication, and that the wolf population that gave rise to dogs is extinct.

The authors, a team of geneticists co-led by John Novembre at the University of Chicago in Illinois, declined to comment on their work because it has not yet been published in a journal. But Larson and others say that the paper makes a strong point — that studying the genomes of long-dead dogs and wolves is the only way to settle the dispute. At least three other teams in the United States and several others in Europe are racing to sequence ancient dog and wolf genomes, but researchers say that many specimens will be needed to build a clearer picture of domestication. Still, “we’re not in a position to be picky”, says Adam Boyko, a dog geneticist at Cornell University in Ithaca, New York, who was involved in the arXiv paper³. “We’re sort of going to be limited to which samples we can get DNA out of.”

The move to look at ancient DNA could make the small field of dog genetics even pricklier, because archaeological bone samples are so precious. Novembre says that he finds the field more fractious than human genetics, and says that his experience has given him pause about future canine work. “It’s really intense in the dog world,” he says. But Boyko, who also collaborates with the Chinese group, says that although the field is competitive, it remains collegial. “At the end of the day, we sit back and enjoy a beer together when we see each other.” ■

PHARMACEUTICALS

China drugs head fired over article row

Researcher stands by results despite demand for retraction.

BY DAVID CYRANOSKI

Jingwu Zang says he is baffled by the whole affair. Until last month, he was head of a neurodegenerative-disease research unit in Shanghai, China, for London-based drug firm GlaxoSmithKline (GSK). On 22 May, as he tells it, his boss told him that there would be an investigation. The next day, Chinese lawyers showed up at the company to interview him. On 31 May, he was told to hand in his computer and company credit card, and was escorted to his car. “Within a few minutes, I was outside the facility I built,” he says.

On 9 June, he received a letter informing him of his official termination of employment.

The investigation has focused on a paper published in *Nature Medicine* that Zang co-authored on multiple sclerosis (MS), his speciality (X. Liu *et al. Nature Med.* **16**, 191–197; 2010). GSK is asking for the paper to be retracted; Zang stands by the results. The Chinese blogosphere is abuzz over the dispute, wondering what it signals for a centre seen as a bellwether for China’s budding drugs industry.

Zang set up the global research and development centre in Shanghai in 2007. The centre was considered bold: of the many international pharmaceutical giants that had opened research operations in China in the previous five years, only GSK had given its branch wide autonomy, with control over global operations for an entire development sector, that of neurodegenerative diseases. “In Shanghai, we can make decisions that drive global studies,” says Zang.

Now with some 400 scientific staff, the centre has several candidate neurodegenerative drugs in phase I and II clinical trials, Zang says, and he was eager to get one through phase III, to “demonstrate that we can do great science and move a clinical compound forward”.

Four years ago, Zang’s group started work on a protein called the interleukin-7 receptor (IL-7R). “It was a really exciting story,” he says. IL-7R sits on the surface of certain immune cells, and a genetic variant of it had been linked to MS. Nobody knew what the underlying mechanism was, but Zang had a hypothesis — that the IL-7 pathway played a part in the pathogenic expansion of T-helper 17 (T_H17) cells, immune cells that, when present in excess, are thought to contribute to MS.

In 2010, the group published results in *Nature Medicine* concluding that this was indeed the

case. But last month, the paper came under scrutiny from within GSK after the company and *Nature Medicine* were notified of a problem with some of the data. A GSK investigation has since concluded that human blood samples used to create a figure in the article — described in the caption as being taken from patients with MS — actually came from healthy subjects.

On 10 June, GSK posted a statement saying: “Regretfully, our investigation has established that certain data in the paper were indeed misrepresented. We’ve shared our conclusion that the paper should be retracted and are in the process of asking all of the authors to sign a statement to that effect.”

Zang and Xuebin Liu, the paper’s first author, both say that this was an unintentional mistake that does not change the paper’s overall conclusion. Liu, whose group ran the experiment and compiled the data, says that the team had hoped to use data from cells of patients with MS and had drafted a manuscript with that wording. But although preliminary data from patients did reveal Zang’s proposed link between the IL-7R pathway and T_H17 cells, staining in those images was inadequate — so the team turned to healthy subject data instead, Liu says. In a hurry

“Regretfully, our investigation has established that certain data in the paper were indeed misrepresented.”

to beat competition, they forgot to change the caption. Liu says that cells from either group can be used to show the effect.

Liu also addressed another problem, noted later on a pharmaceutical blog, after news of the investigation came out: two images, with captions describing different experimental conditions, are identical. Liu says that the mistaken duplication occurred during editing and layout of the article, and has asked *Nature Medicine* to check. The journal’s chief editor Juan Carlos López says that he cannot comment yet.

The main thrust of the paper — that IL-7R is related to MS, and that blocking its function can ameliorate MS-like disease in a mouse model — largely agrees with results from other groups. But scientists have failed to replicate the specific mechanism proposed by Zang’s team.

One of those studies, led by researchers at Stanford University in California and at Rinat, a subsidiary of the drugs giant Pfizer based in South San Francisco, California, found ►

1. Axelsson, E. *et al. Nature* **495**, 360–364 (2013).
2. Wang, G.-D. *et al. Nature Commun.* <http://dx.doi.org/10.1038/ncomms2814> (2013).
3. Freedman, A. H. *et al. Preprint available at* <http://arxiv.org/abs/1305.7390> (2013).

► that the effects of blocking IL-7R largely agreed with the results from Zang's group. But they were unable to reproduce the results of Zang and Liu's experiments that supported a connection between IL-7R and T_H17 cells as the mechanism. The discrepancy was "not likely due to differences in the experimental protocols, because we diligently followed their methods", the researchers wrote in their 2011 report in *Science Translational Medicine* (L.-F. Lee *et al. Sci. Transl. Med.* **3**, 93ra68; 2011). Stanford's Lawrence Steinman, a corresponding author on the California study, declined to comment.

But Liu says that the California experiment differed from the China experiment in an important way: the GSK team used mature T_H17 cells whereas the California group used undifferentiated ones. "It's a different protocol, a different stage," he says.

Liu says that as first author he takes full responsibility for the mistakes. On 9 June, he announced his resignation on a Chinese bioscience website. Both Liu and Zang say that they stand by the paper's results and will not sign a letter to *Nature Medicine* requesting that the paper be retracted. López says that a retraction is still possible, even if not all of the authors agree to it, "if confidence in the paper is lost". In such cases, "the paper is still retracted, explaining who agrees and who doesn't agree to the retraction", he says.

Asked whether a retraction is warranted if the mistakes do not affect the paper's findings, David Daley, GSK's director of global external communications, acknowledges in an e-mail that in the period since the research was carried out, "an independent body of evidence has accumulated that the receptor [for] interleukin-7 (IL-7) is a valid target for a variety of autoimmune disorders". But he adds that "because certain data in the publication were misrepresented, we believe retracting the paper is the only appropriate action to take".

Zang, who was involved in the experimental design and in drafting the manuscript, but not in the hands-on experiments or data compilation, believes that he was fired not over data misrepresentation but for allegedly "influencing the investigation". The letter terminating his employment states that he "wilfully and purposefully undermined and misled this investigation and provided untruthful information" — charges he vehemently denies.

Daley declined to detail GSK's reasons for terminating Zang's employment, but provided a GSK statement: "We are confident in the thorough investigation we conducted and the actions we have taken as a result of our findings. We will not tolerate activity and behaviour that falls short of the high standards expected from our employees."

Zang says the whole episode is bizarre. "I still can't understand it." ■

SPACE RACE

The Soviet moonwalker Lunokhod 2 travelled 42 kilometres, 5 km farther than scientists had long thought — delaying a chance for NASA's Mars rover Opportunity to set a new off-Earth driving record.

EXPLORATION

Space rovers in record race

Revised data show Soviet Union's 1970s lunar vehicle outdistanced NASA's Opportunity — for now.

BY ALEXANDRA WITZE

Alexander Basilevsky always wanted to stop driving. As a planetary geologist working with the Soviet Union's remotely controlled lunar rovers — Lunokhod 1 and Lunokhod 2 — in the early 1970s, Basilevsky was constantly asking mission chiefs to halt the rolling explorers for scientific studies, fascinated by the buffet of rocks and soil captured by the vehicles' cameras. But the bosses in the Soviet space programme were having none of it. "It is Lunokhod, not 'Lunostop!'" they told Basilevsky as they kept the rovers driving, intent on covering as much ground as possible.

Now it seems that the second rover, Lunokhod 2, went even farther than many back then had thought. New calculations, using images from orbit that trace the rover's 40-year-old tracks far below, show that Lunokhod 2 travelled some 42 kilometres in its lifetime — 5 kilometres more than the distance recorded in the official mission logs. And that means that NASA's Opportunity rover, inching up to the 37-kilometre mark after nearly a decade on Mars, has a long way to go to break the record for the distance driven by a wheeled vehicle

on another world (see 'Space race').

In a mid-May news release about Opportunity's longevity, NASA cited the 37-kilometre distance for Lunokhod 2, and some team members speculated to the press that Opportunity would soon set a new record for driving distance off-Earth. Since then, they have pulled back from any predictions of besting the Russians, even though Opportunity's odometer was at a tantalizing 36.75 kilometres as of 15 June.

"We're not going to talk about breaking any records" just yet, says Opportunity's principal investigator, planetary scientist Steven Squyres of Cornell University in Ithaca, New York. "I'm awestruck by what the Lunokhod team managed to accomplish so many years ago, and I wouldn't want to claim that we've passed their record unless we're really sure."

Russian scientists, for their part, are quite certain about their revised 42-kilometre estimate, and have reported the findings at various planetary-science conferences over the past year.

The 1.7-metre-long Lunokhod 2 rover explored the Moon's

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For more on NASA's Mars rovers, see: go.nature.com/fod9ud