Gene tests on dogs boost hopes for haemophilia

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Scientists on Tuesday said they had treated haemophilia in dogs by fixing a flawed gene, marking a step forward towards treating the condition in humans, too.

Haemophilia A, the most widespread form of the inherited bleeding disease, occurs in around one in 10,000 men.

It occurs through a malfunctioning gene, passed on through the maternal line, that causes a deficiency in a blood-clotting protein called Factor VIII.

There is currently no cure. Uncontrolled bleeding is treated by coagulant injection, although some patients' immune systema can react to this.

A team led by David Wilcox at the Medical College of Wisconsin in Milwaukee used a virus as a microscopic Trojan Horse in tests on dogs.

They tucked a functioning version of a gene called ITGA2B into a harmless virus.

The virus was then used to "infect" three dogs with haemophilia A, delivering the good gene into stem cells that make platelets, or tiny cell fragments that clot the blood.

Two of the dogs that produced the highest levels of Factor VIII after the therapy had no episodes of severe bleeding throughout the two-and-a-

half-year duration of the study.

None of the three dogs required drugs to suppress its immune system after being given the new gene, according to the study, appearing in the journal *Nature Communications*.

Gene therapy is based on the idea that inherited diseases may be combatted by slotting in functioning genes to replace defective ones.

It burst on the medical scene in the late 1990s and is one of the most alluring areas of biotechnology, offering the theoretical promise of blocking or reversing inherited disease.

But this new frontier has also been hit by occasional setbacks, notably an unexpected or uncontrollable response from the immune system.

So far, successes have been few, limited to single-gene disorders—as opposed to complex multi-gene disorders that account for the commonest diseases.

In July, scientists in Italy said they had treated six children with metachromatic leukodystrophy, a disease of the nervous system which is caused by mutations in the ARSA gene.

Setbacks have included the death of an 18-year-old US volunteer, Jesse Gelsinger, in 1999, and the development of cancer among two French children treated for "bubble baby" syndrome, a chronic lack of immune defences.