

= Snuppy =

Snuppy (Korean : ??? a portmanteau of " SNU " and " puppy " ; born April 24 , 2005) is an Afghan hound , credited with being the world 's first cloned dog . The puppy was created using a cell from an ear from an adult Afghan hound and involved 123 surrogate mothers , of which only three produced pups (Snuppy being the sole survivor) . Department of theriogenology and biotechnology at Seoul National University for cloning Snuppy was led by Dr. Byeong Chun Lee . Snuppy has since been used in the first known successful breeding between cloned canines , after his sperm was used to artificially inseminate two cloned females , which resulted in the birth of 10 puppies in 2008 .

= = History = =

After Dolly the sheep was cloned in 1996 , scientists had managed to clone numerous other animals , including cats , cows , gaur , horses , mice , mules , pigs , rabbits and rats but had been unable to successfully clone a dog due to the problematic task of maturing a canine ovum in an artificial environment . After several failed attempts by other scientists , Byeong Chun Lee , a professor of Seoul National University , were able to successfully create a clone using tissue from the ear of a 3 @-@ year @-@ old Afghan hound . 123 surrogate mothers were used to carry the embryos , of which 1 @,@ 095 were implanted , the procedure resulted in only three pregnancies ; one resulted in a miscarriage , the other pup was born successfully but died of pneumonia three weeks after birth , the successful clone was carried by a Labrador Retriever . From the original 1 @,@ 095 embryos to the final two puppies , this placed the success rate of the project at less than two tenths of a percent . Snuppy was named as a portmanteau of the initials of the Seoul National University (SNU) and the word " puppy " .

= = Process = =

As the eggs in a female canine are only fertile during the estrus phase of the estrous cycle , the eggs could only be harvested during a three @-@ week period each year . Due to complexities with removing eggs from canine ovaries the eggs had to be extracted from the oviduct , which required constant monitoring to achieve . The nucleus of each egg was replaced with the cell from the ear of the adult dog and then electrified and fused using a chemical reaction . The embryos were then transferred to the surrogate dogs . Three of the surrogate mothers became pregnant and two successfully gave birth . Snuppy , the first to be born , survived while the other died two weeks after birth . This process of cloning Snuppy took nearly three years of intensive effort .

= = Reaction = =

Snuppy was named as Time Magazine 's " Most Amazing Invention " of the year in 2005 . Particular recognition was given to the cloning technique used in the process , which Time stated was " embodied by a history @-@ making puppy " . Despite numerous labs performing mammalian cloning , they cited that Hwang 's team and Snuppy were " extraordinary " . The experiment was criticised by Robert Klitzman , director of Columbia University 's Masters in Bioethics program , who cited that the process raised the question of if humans are " just a mass of cells and biological processes ? " Hwang himself criticised the process , stating that it did not bring science any closer to human cloning and the complexities , coupled with the low success rate (one in 123) , did not make it ethical to clone family pets . Ian Wilmut , the scientist behind the successful cloning of Dolly the sheep , said that the successful cloning of Snuppy proved that any mammal could be cloned in the correct environments and that a global ban on human cloning needed to be quickly implemented because of this . The Kennel Club criticised the entire concept of dog cloning , on the grounds that their mission is to " To promote in every way the general improvement of dogs " and no improvement can occur if replicas are being created .

= = Controversy = =

Between late 2005 ? 2006 Hwang was accused of a series of misconducts . The first allegations related to his work prior to Snuppy ; the claim that he had successfully cloned a human embryo . The charges alleged Hwang had paid for egg donations and that some of eggs came from his employees , which constitute serious breaches of the code of bioethics . It was later found that photographs he published did not depict what was suggested and that most of the stem @-@ cell lines he claimed to have created were not clones at all . This brought serious doubts onto the validity of Snuppy , which Hwang consistently claimed was a genuine clone . Hwang hired HumanPass Inc . , a Korean DNA lab to investigate Snuppy , who found that Snuppy was authentic . The findings by HumanPass were dismissed on the grounds that they were employed by Hwang , and a panel at the Seoul National University ordered their own investigation . The investigation found that , despite his fabrications in previous projects , Hwang 's research related to Snuppy was accurate and Snuppy was a clone of the adult Afghan hound . As a result of his forgeries , Hwang was indicted for fraud and dismissed from the university .

= = Developments = =

Veterinary professor Byeong Chun Lee took over leadership of the team behind Snuppy . In 2008 , Snuppy became involved in the first known successful breeding between cloned canines , after sperm taken from Snuppy was used to artificially inseminate two cloned females , which resulted in the birth of 10 puppies . Nine of the puppies survived . The SNU team , under Lee , have gone on to successfully clone over 30 dogs and five wolves . After successfully breeding the cloned wolves , Lee claimed that the ability to breed cloned canines makes it possible for working dogs which are usually sterilised before training , such as sniffer dogs and guide dogs , to reproduce . SNU , which claimed to own the patent for the process used to clone Snuppy , formed a license agreement with RNL Bio , a commercial pet cloning company . Hwang entered into a partnership with RNL Bio 's competitor , BioArts International , which caused an ongoing legal battle into who owns the patent rights although Bio Arts withdrew from dog cloning in 2009 . RNL completed the first commercial cloning in August 2008 but ran into financial trouble in 2013 .

The world 's first cloned sniffer dogs (all of which are named Toppy) were put to work by South Korean customs in July 2009 .

Supporters of Hwang founded a company called Sooam Biotech where Hwang developed proprietary techniques based on a licence from ViaGen 's subsidiary Start Licensing (which owns the original Dolly patent) and created cloned dogs for owners whose dogs had died , charging \$ 100 @,@ 000 a time Sooam Biotech was reported to have cloned 700 dogs by 2015 and to be producing 500 cloned embryos of various species a day in 2016 .