



## Severe Combined Immunodeficiency (SCID)

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Severe Combined Immunodeficiency (SCID) is a lethal genetic disorder that results in an affected foal being born with a severely weakened immune system. SCID is caused by a mutation in the coding for the enzyme DNA-protein kinase catalytic subunit (DNA-PKcs) located on chromosome 9, which is responsible for the formation of key immune defense molecules. Because the foal's natural defense system against infection is not functioning properly, by the time they are five months of age, they die of an opportunistic infection (such as pneumonia) or they are euthanized. A reference list for additional information on SCID can be found at: <http://www.vetgen.com/equine-references.html>.

SCID is known to be an autosomal recessive trait. "Autosomal" means that there is no sex linkage, so both males and females can be equally affected. "Recessive" means that in order for a foal to be affected, it must have received two copies of the mutated gene, inheriting one copy from each parent. Horses that have one copy of the mutated gene, in combination with one copy of the normal gene, are physically normal but are considered carriers and have a 50% probability, each time they are bred, of passing the mutation along to their offspring. Although the first veterinary publication on SCID appeared in 1973 and the mode of inheritance was determined in 1980, it wasn't until 1997 that a direct DNA test became commercially available. The use of this test allows breeders to make informed breeding choices and avoid ever breeding an affected foal.

Test kits can be ordered through FOAL for a discount of \$99/tests - [http://www.foal.org/SCID\\_CA\\_LFS\\_KitOrder.pdf](http://www.foal.org/SCID_CA_LFS_KitOrder.pdf)

or:

Arabian F.O.A.L. Association  
Marguerite Illing, Treasurer  
PO Box 198  
Parksville, NY 12768-5336  
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FOAL also has a voluntary listing of VetGen SCID tested horses available for public access on their website at <http://foal.org/Test-Kits---Forms.html>; this list includes clear, carrier and affected animals that have been reported. Forms for sending test results to FOAL can also be found on the FOAL website.

It is important to note that SCID has appeared in virtually all major modern bloodline groups. As such, unless horses have been tested or are known to have immediate ancestors who have all tested clear, they should not automatically be assumed to be clear. SCID is also not limited to only purebred Arabians; the mutated allele can be passed on by purebred Arabians used outside of purebred breeding programs, and some part-Arabians have been tested as SCID carriers.

### ARABIAN HORSE ASSOCIATION<sup>SM</sup>

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From the 1970's through 1997, SCID carrier estimates from research studies have ranged from 8% – 28% with SCID affected foal estimates ranging from 0.18% - 3% [note: the 28% carrier rate calculated in the 1970's is thought to have been greatly overestimated]. From the start of testing in 1997 through December 31, 2011, VetGen has tested >10,600 horses with 15.73% testing as SCID carriers and 0.30% testing as SCID affected [a total of 32 affected foals tested). Although this is not a truly random sampling, it does provide a snapshot of the prevalence of SCID in the Arabian gene pool.

NOTE: The number of affected foals cited above is based **only on those foals tested by VetGen** (it does not include SCID affected foals who did not have samples submitted to VetGen for testing). As such, the total number of affected foals born is expected to be higher than the number tested by VetGen. The number of SCID affected foals born in any year is directly related to the number of carrier to carrier matings.

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