

PREGNANT MARE SERUM GONADOTROPIN (PMSG)

What is it?

Pregnant mare serum gonadotropin (PMSG) is a hormone produced in pregnant mares (female horses) to support the developing fetus. It is also known as equine chorionic gonadotropin (eCG) or horse serum.

What is it used for?

PMSG is used to artificially induce oestrus in female animals; most commonly in animals produced for food, in particular sows (female pigs) but also in beef cattle, goats, and sheep as well as lab animals.

The use of PMSG in the pig industry means sows come into heat at the same time, can be artificially inseminated at the same time and therefore give birth within a similar time, all of which facilitate management and increase efficiency for the farmer. By using PMSG, puberty can be accelerated, sows come into heat earlier after weaning the piglets, and litter size can increase, thus benefitting productivity. In the marketing brochure for product [Fertipig](#), pharmaceutical company Ceva Santé Animale states that PMSG results in increased economic efficiency, higher insemination rate, higher number of piglets and, less non-productive days.

How and where is it produced?

To extract and purify PMSG, pregnant mares are housed at production sites known as blood farms. Mares are inseminated, either by artificial insemination or using stallions. As mares approach day 40 of pregnancy, small samples of blood are taken to test for the presence of PMSG. Once testing positive for PMSG, large volumes of blood (5-10 litres) are collected from the jugular vein using large-bore needles for around 4-11 weeks, once or several times a week, between day 40 and day 130 of pregnancy^{1,2,3,4}. During the procedure, horses are placed in a restraint box⁴. European manufacturers such as Merck/MSD Animal Health (Germany), Ceva Santé Animale, and Laboratorios Hipra (Spain) buy the blood, extract the PMSG hormone and sell the final product as powder with a solvent to make a solution which is injected into female animals³.

Production of PMSG is difficult to track but it is thought to occur predominantly in Argentina, Uruguay, Iceland, and China. Although the production of pregnant mare's blood is not specifically banned, it is in breach of EU law and entails serious welfare concerns⁵. Iceland is the primary exporter of PMSG to the EU. In 2021, the Animal Welfare Foundation revealed that across 119 farms in Iceland, 5,383 blood mares were farmed to produce PMSG, supplying farmers across the UK and Europe². In 2023, Icelandic authorities admitted to breaching rules applying in the European Economic Area (EEA) and were not properly applying its legislation on the protection of animals used for scientific purposes. Both these legal texts (EU Directive 2010/63 (EU legislation that applies in the EEA) and Icelandic Regulation 460/2017 (based on EU directive)) state that procedures for the manufacture of drugs, such as blood collections, are classified as animal experiments and that animal experiments must be replaced by alternative whenever possible⁶. In 2019 the Animal Welfare Foundation revealed that a German stud farm in Meura had been collecting blood without authorisation for over 30 years. In 2020, following public pressure, the blood farm was approved under animal experimentation. However, animal experiments must fulfil the requirements of indispensability (3Rs: Replacement, Reduction, Refinement) and ethical justifiability. Since numerous alternatives to PMSG are readily available, the 'animal experiment' is not indispensable and is therefore unlawful. The stud farm stopped PMSG production in 2022 after losing its buyer (CEVA Santé Animale). While there is no evidence of blood farms in other EU countries, this cannot be excluded. There are no specific regulations, such as a limit on the volume of blood taken and the frequency of extraction, and there is little oversight concerning the welfare of mares on blood farms¹.

What are the welfare issues?

For Mares:

- Extraction may be violent leading to serious injuries and even death¹. Animal Welfare Foundation conducted several investigations in Icelandic and South American blood farms and witnessed the abuse of mares^{6,7,8}.
- Routine abortion of foetuses from pregnant mares is used to enhance productivity¹ – pharmaceutical companies are not profitable without abortions³.

- If foals are born, they are an unwanted byproduct sold off straight away for meat.
- The volume of blood collected for PMSG extraction is not regulated. Reports state that 5-10 litres of blood is taken in one sampling but there is no limit to how much can be taken in one sample, occasionally resulting in death.
- Mares often suffer from anaemia, emaciation, and deficiency diseases⁶.
- Mares are generally managed extensively on pastures with minimal veterinary oversight, poorly desensitized and not habituated to handling and other practices.

For Sows:

- Results in larger litter sizes, increasing the risk of animals born small, weak, and malnourished. With large litters the sow will have more piglets than she has teats to be able to feed them all⁵.
- Promotes unnatural rates of reproduction and reduces the time for sows to recover between pregnancies⁶.
- Induces puberty early in gilts (young female pigs) which doesn't allow for full development and can result in early infertility and slaughter⁶.

What are the alternatives?

Hormone-free methods - successfully used to synchronise oestrus on organic and conventional farms. Methods include rehousing, exercise, outdoor climate, optimal nutrition, contact with females in oestrus and male contact. The boar effect (male contact) is often used in conjunction with a hormonal treatment and involves tactile, visual but above all olfactory contact between boars and sows.

Progesterone or its synthetic analogue (al-llyltrembolone, altrenogest) - can also be used for induction and synchronisation of oestrus and also increases ovulation and pregnancy rate^{9,10,11}. However, these methods do not consistently optimise reproductive performance of livestock. Some studies found alternative altrenogest to have positive production effects^{12,13} but others found no positive effects and even some negative effects^{14,15}. It is thought the effects of altrenogest on the productive performance of pigs is dependent on parity and treatment duration¹⁶. Synthetic alternatives are available on the EU market (e.g. Regumate) and according to the German Ministry of Agriculture, thirty-six veterinary alternatives are available^{3,9,17}.

“The practice of extracting PMSG from pregnant mares in order to synchronise pregnancy in intensively farmed sows is the cause of suffering to horses. While the practice is in breach of EU law, there is nothing to stop producers importing the hormone from elsewhere in order to maximise the production of pork products at industrial farms within Member States. Policy makers should ban the production and import of PMSG. All retailers and food companies should commit to only sourcing products from higher welfare, cage-free suppliers which do not use PMSG, the cause of immense suffering to these sentient beings.”

Compassion in World Farming, 2024

-
- ¹ Manteca Vilanova, X., De Briyne, N., Beaver, B., & Turner, P. V. (2019). Horse welfare during equine chorionic gonadotropin (eCG) production. *Animals*, 9(12), 1053
- ² Iceland urged to ban 'blood farms' that extract hormone from pregnant horses | Environment | The Guardian
- ³ 1330 PMSG (fve.org)
- ⁴ 2022 10 13 efa Policy Briefing eCG: Exploiting mares to increase animal production (eurogroupforanimals.org)
- ⁵ Eurogroup for Animals: <https://www.eurogroupforanimals.org/library/equine-chorionic-gonadotropin-ecg-production-import-and-use-eu>
- ⁶ Animal Welfare Foundation Blood Farms. [(accessed on 30/01/2024)]; Available online: <https://www.animal-welfare-foundation.org/en/projekte/blood-farms>
- ⁷ Animal Welfare Foundation - Investigation footage. [(accessed on 07/02/2024)]; Available online: [2015](#); [2017](#); [2018](#).
- ⁸ World Horse Welfare and Eurogroup for Animals. Removing the Blinkers: The Health and Welfare of European Equidae in 2015. World Horse Welfare and Eurogroup for Animals; Brussels, Belgium: 2019. [(accessed on 30/01/2024)]. p. 120. Available online: https://www.eurogroupforanimals.org/files/eurogroupforanimals/2021-12/EU-Equine-Report-Removing-the-Blinkers_0.pdf
- ⁹ Kraeling, R. R., Dziuk, P. J., Pursel, V. G., Rampacek, G. B., & Webel, S. K. (1981). Synchronization of estrus in swine with allyl trenbolone (RU-2267). *Journal of Animal Science*, 52(4), 831-835.
- ¹⁰ Strategie manageriali per migliorare le performance riproduttive. [(accessed on 30/01/2024)]; Available online: [untitled \(suivet.it\)](http://www.suivet.it)
- ¹¹ Martinat-Botté, F., Bariteau, F., Forgerit, Y., Macar, C., Poirier, P., & Terqui, M. (1994). Control of reproduction with a progestagen—altrenogest (Regumate) in gilts and at weaning in primiparous sows: Effect on fertility and litter size. *Reproduction in Domestic Animals*, 29(4), 362-365.
- ¹² Martinat-Botte, F., Bariteau, F., Forgerit, Y., Macar, C., Moreau, A., Terqui, M., & Signoret, J. P. (1990). Control of oestrus in gilts II. Synchronization of oestrus with a progestagen, altrenogest (Regumate): Effect on fertility and litter size. *Animal Reproduction Science*, 22(3), 227-233.
- ¹³ Martinat-Botté, F., Bariteau, F., Forgerit, Y., Macar, C., Poirier, P., & Terqui, M. (1995). Synchronization of oestrus in gilts with altrenogest: effects on ovulation rate and foetal survival. *Animal Reproduction Science*, 39(4), 267-274.
- ¹⁴ Ferná, L., Dí, C., & Carbajo, M. (2005). Reproductive performance in primiparous sows after postweaning treatment with a progestagen. *Journal of Swine Health and Production*, 13(1), 28-30.
- ¹⁵ Van Leeuwen, J. J. J., Martens, M. R. T. M., Jourquin, J., Driancourt, M. A., Kemp, B., & Soede, N. M. (2011). Effects of altrenogest treatments before and after weaning on follicular development, farrowing rate, and litter size in sows. *Journal of animal science*, 89(8), 2397-2406.
- ¹⁶ Wang, Z., Liu, B. S., Wang, X. Y., Wei, Q. H., Tian, H., & Wang, L. Q. (2018). Effects of altrenogest on reproductive performance of gilts and sows: A meta-analysis. *Animal reproduction science*, 197, 10-21.
- ¹⁷ [Pregnant Mare Serum Gonadotropin \(PMSG\) Production, Approval and Use - PDF Free Download \(docplayer.org\)](#)