

Interview with

# DR. MARIA FERRER



by  
Laurie  
Schmelzle

**D**r. Maria Soledad Ferrer, DVM, MS, DACT leads the equine theriogenology program at Kansas State University's Veterinary Medical Teaching Hospital in Manhattan, Kansas, USA. In the following interview Dr. Ferrer discusses several topics related to the field of theriogenology including equine reproduction, current technology, and general management.



**Laurie Schmelzle:** Would you tell us a little bit about your background, where you grew up, and how you were introduced to horses?

Dr. Maria Ferrer: I am originally from Argentina. I was born in Buenos Aires City. When I was about three years old, we moved to the surrounding area of Buenos Aires. I grew up mostly in the city, but Aires is strange in that the racetrack was 15 blocks from my house, so there were barns and horses all over the place. I cannot remember exactly when I started wanting to go into horses and when my passion for horses started, but my family was very good at finding out what my passion was. Like my brother and music, they figured out what we wanted to do and they helped us. My grandfather was an agricultural worker, and he used to saddle break horses which was one of the most important jobs among agricultural workers, and he was pretty proud of that. He was always talking about the times when he was young and his horses. So I think he had the most influence on me and horses. He would take me to rodeos and teach me all the color coats, and conformation. He would make me look at the legs, how horses stood, and how they walked. But it was my parents who actually realized what I wanted to do and encouraged me in the way towards horses and what I am doing today. When I look back at my toys and things like that, I did have dolls and I was a normal kid (laughing), but my parents would buy a little microscope and a little chemistry kit, so they did encourage me a lot. When I was six years old they got me into riding school, and since then they couldn't get me off the horses!

**LS:** Did you go to college in Argentina, or here in the US?

MF: I went to Buenos Aires University, which was unusual because you have a 12 million person city, and then in the



middle you had this big area with cows and horses.

**LS: Did they have an equine program at the college?**

MF: They did. The program is 6 ½ years. The first six years is the same for everyone, and before the last half-year you had to decide whether to go into large animal or small animal, or public health. Within the city there were two racetracks and at least five riding clubs, and the school works with a lot of those.

**LS: What kind of horses did you ride?**

MF: Warmbloods. I rode dressage.

**LS: What breeds were there in Argentina, and in Buenos Aires?**

MF: The main industry in Argentina is racing, so it is mainly Thoroughbreds. There is another big industry which is Polo Ponies, and Warmbloods are probably the third biggest industry. Arabians are quite serious, but it's not such a large industry. I think now there are probably more around. We didn't have Arabian races until I was 15 years old or so, but now that industry has grown over the years.

## TherIOGEnoLoGy

**LS: Can you explain what the field of theriogenology is?**

MF: Theriogenology is a clinical specialty that deals with reproduction in animals. The human counterpart would be gynecology, obstetrics, andrology, and neonatology. So we go from the egg to the first few weeks of life of the baby.

**LS: When you were studying to specialize in theriogenology, was it specifically an equine specialty or did you work with all types of animals?**

MF: The specialty is all species. So your exam is multi species, and you are qualified to work on all species. Then what you decide to do is your personal choice.

**LS: Do you practice just on horses at Kansas State University, or do you practice on multiple species?**

MF: I practice on multiple species, but about 70% of my work is on horses. I do a lot with alpacas, and also with dogs.

**LS: When did you move to the United States?**

MF: In 2002 I moved to the US for my residency. It was about two years after I graduated that I got the residency to work on my specialty, which I did in Louisiana. Then I went back to Argentina for a year, and then I came back here to work. I started working for Kansas State University in 2006.

## General Equine Reproduction

**LS: Are some breeds of horses more prone to reproductive**

**problems than others?**

MF: There are some breeds that are more prone to some specific problems. For example, Friesian horses and draft horses are more prone to having retained placentas. Ponies or draft horses are maybe more prone to dystocias. As far as fertility goes, I don't think there are large differences in breeds. There are registries that are more serious at limiting which stallions in particular can breed and which ones can't. For example, Warmbloods will do a full breeding soundness exam, and only the stallions that pass the BSE will be registered for breeding. That might help in the overall pregnancy rates.

**LS: Do you see any problems that are more common in Arabian horses?**

MF: No. I think the main problem is straining during rectal palpation. You need to be especially careful with them. But that is not the horse's problem, it is the operator's problem, and they just need to be aware of that.

**LS: What is CEM, and how do we prevent its spread?**

MF: CEM is contagious equine metritis. It's a bacterial infection. It is venereal so it's spread through live cover, and also through artificial insemination (AI). It is basically prevented with good sanitary measures, by using gloves when you are washing the stallion or washing the mare, keeping a separate artificial vagina for each stallion, and by disinfecting equipment between stallions. From mare to stallion, you can prevent it by collecting the stallion on a phantom and inseminating the mare. From stallion to mare, you can prevent it by treating the semen with antibiotics. And of course it can be prevented by testing and not using positive animals.

**LS: Is CEM hard to clear up?**

MF: It is not hard to clear up. The good thing is that the bacteria are fairly sensitive to most of the antibiotics that we use, so usually it's cleared up fairly easily. Mares are probably a little bit harder than stallions to clear up, but most of the time it is fairly easy to clear.

**LS: And it's important just knowing that it's there.**

MF: Right, because you can have asymptomatic carriers. The mares can have symptoms about two weeks after they are inseminated. Some of the mares might have some vulvar discharge and infertility, but once they become chronic carriers, there are no signs. You can't tell they are infected unless you test them.

**LS: What is Equine Viral Arteritis (EVA), and how can we manage it?**

MF: EVA is equine viral arteritis. It is a viral disease, and it is also venereal. The virus can be shed in semen for years, and you can also have asymptomatic carriers, not having signs. It is controlled by testing stallions and mares. There are vaccines you can use, and we usually recommend here in the US vaccinating stallions. In mares, if you are going to ship

semen or breed your mare to a stallion, we usually recommend you have proof of seronegative status of the stallion. Or, if he's vaccinated have proof of vaccination. If you don't have proof of vaccination and you don't know the status of the stallion, isolate the mare for at least three weeks after she's inseminated. That way you'll prevent spreading of the virus. The mare that gets bred to a positive stallion is not the big deal. Usually they don't have anything serious, maybe a transient fever. But when that mare goes into the herd with pregnant mares, and sheds the virus to the pregnant mares, those mares can lose their pregnancies.

**LS: So there is a danger to the mares that are already pregnant?**

MF: Yes.

**LS: Can stallions only get EVA from other mares that they've bred?**

MF: No, it's primarily a respiratory disease. They can get it at a show from respiratory contact with other horses. That's how the pregnant mares in a herd get it from the recently inseminated mare...either through respiratory secretions or from the semen that runs out from the inseminated mare.

**LS: Are there complications with exporting a horse that has been vaccinated for EVA?**

MF: There might be. There are some countries that will not take seropositive horses even if you can prove they were vaccinated. It depends on what your market is expected to be. If you are thinking of exporting semen or horses to that particular country, then you might not want to vaccinate that horse.

## STALLION FERTILITY

**LS: How do you begin your diagnostics when a stallion is brought to you to because he is not settling mares?**

MF: We start with a history from the owner or stallion manager, and what they can tell us about how many mares the stallion has bred, how many got pregnant, and how they do the breeding. A lot has to do with the management of the horse, the way they are setting things up, and the way they are handling the horse. There may be over-expectations with younger horses that are expected to breed so many mares, and maybe they don't have enough semen to breed so many mares. A lot of the problems are management, and the history will give us a lot of ideas about the management of the horse.

**LS: At what age is a stallion in that range where maybe he's a little young?**

MF: Between two and three. Usually between four and six they have reached their full capacity.

**LS: How many mares would it be reasonable to expect the average two or three year old stallion to breed?**





MF: I would start with one mare every day, or one mare every other day for natural cover. For AI, you might be able to split the ejaculate into two. But when you do your breeding soundness exam, you can calculate the amount of sperm they produce, and then you can adjust the number of mares. That would be the ideal thing to do.

**LS: What are some examples of management or environmental factors that affect stallion fertility?**

MF: An example of management would be overbooking. Environmental factors can be the number of hours of light the stallion is exposed to, and heat. Sometimes if it too hot in the summer they can have changes in testicular function. If they have a fracture and they have restricted exercise, they might also have changes in their venous return and accumulate fluid around the testes.

**LS: What are some of the other more common types of stallion infertility problems?**

MF: I would say testicular degeneration, by far.

**LS: Is that age related, or related to management or environment?**

MF: It can be age related or related to some of these other things. As they get older, they might start getting some degeneration. Any fevers, toxins, drugs, or a number of other things can lead to degeneration.

**LS: Do you see certain kinds of stallion infertility that tend to be inherent?**

MF: We do see stallions whose brothers or whose sons tend to start having testicular degeneration or changes in their semen quality sooner than expected. We think sometimes that there is a genetic relationship to that, but there is nothing that confirms that. We have the clinical impression when we look at them and see their history, but there is nothing to prove it.

**LS: When you are analyzing a stallion from a reproductive standpoint, do you see certain factors early on that will indicate whether that stallion's semen will ship and freeze well, or do you have to test ship and test freeze that horse to find out?**

MF: You just have to test them. Of course if you have a stallion that starts out with 10% motility, he's not going to freeze that good. But even among horses that have great semen quality, some of those may not ship well, or may not freeze well. We

actually have to test.

**LS: Do stallions that tend to ship well also tend to freeze well?**

MF: Most stallions that freeze well will ship well. The other way around is not so clear. I would not say that all the horses that ship well will freeze well.

**LS: Are there any easy steps that people can take to help manage their stallion's fertility?**

MF: The main thing would be to know what you have, and do a breeding soundness exam at the beginning of each season to know your numbers and how many mares he can breed. Of course good nutrition and keeping him in a good environment helps.

**LS: Do you see stallions that show a preference for, or an avoidance of mares of a particular color?**

MF: Yes, there are horses that have a preference for some colors, and horses that maybe got kicked by a mare of one color and they won't have anything to do with mares that are that color. They also have positive and negative experiences that they learn from.

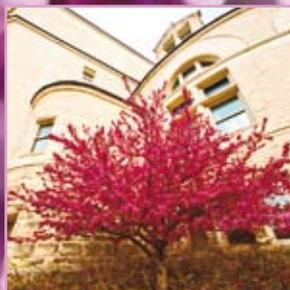
**LS: Have you experienced any particularly uncommon or unusual problems related to stallion infertility?**

MF: The most difficult one we had was one horse with no libido. He would need a different mare every day, and a different color every day. Once it took us six hours on Sunday to get one sample. We ended up trying four different mares, and he went for the paint gelding. The owners just couldn't believe it.

## EMBRYO TRANSFER



*Above: 7-day equine embryo*



**LS: What percent of breeding today is done by embryo transfer (ET)? How do those numbers compare to 10 years ago?**

MF: I don't know the specific percentage but it's increasing over the years, especially with some registries now allowing more than one registration per year out of the same mare.

**LS: What percentage of mares are being bred by ET here at KSU now, compared to past years?**

MF: It has been higher over the years. I think most of the mares that we see bred by ET are halter class horses. The percentage is still low, maybe less than 10%. But over the years we are seeing increases, slowly, but it's mainly the halter type/Quarter Horses.

**LS: Which mares are the best and worst ET candidates?**

MF: The best are of course going to be the young fertile mares; the mares that are presented to you just to expand their genetics or because they are on the show circuit. The worst candidates would be the old subfertile mares that tend to have problems with post-breeding endometritis. We flush the embryo seven days after ovulation. The egg is coming from the donor mare, and it lives in the donor mare's uterus and oviducts for seven days. So if the mare is old and she has abnormal eggs, she'll have lower pregnancy rates. If she has an abnormal uterus or oviduct(s), then those embryos are also going to be subnormal. She'll have lower conceptions rates, and those are the worst.

**LS: Does ET normally cause any problems for young mares?**

MF: No, it doesn't.

## ICSI

**LS: Would you explain what ICSI is, and how it is being used today?**

MF: ICSI stands for Intracytoplasmic Sperm Injection. What you are basically doing is taking one sperm, and injecting that sperm into the egg. ICSI was initially developed for male factor infertility. So in humans, those men who had few sperm numbers, or few normal sperm, then you would only need one sperm to get pregnancies. In horses, ICSI has also been used for stallion infertility. It's been used when you have a stallion that dies. You can freeze semen from their epididymis and then use that semen for AI later, or you can use ICSI if you want to maximize the number of foals with the sperm that you have available. There are also people using ICSI with mares that die. You can ship the ovaries to the lab, and then they can collect the eggs from those mares and then do ICSI. With some kinds of mare infertility, for example if you have a mare with pyometra, or with a fungal infection of the uterus, you might be better off doing oocyte transfer or ICSI, than doing ET, because [with ICSI or oocyte transfer] the egg is not in contact with that infected uterus.

**LS: Can you explain the difference between ICSI and oocyte transfer?**

MF: Yes. With ICSI, you are getting the egg from the follicle of the mare, and you are injecting that egg with sperm, then you are incubating the embryo in vitro, and then transferring that embryo into the mare. So fertilization actually takes place outside of the mare.

**LS: Are you transferring that egg into the recipient mare's oviduct, or uterus?**

MF: I think right now, they are getting up to the blastocyst stage, and putting the egg into the uterus. Initially they were having trouble culturing the embryos in vitro, so they were fertilizing the eggs and transferring them into the oviducts of the mares. I think they got to a point where they can actually culture the embryo to the blastocyst stage.

**LS: And what about oocyte transfer?**

MF: With oocyte transfer, you are actually collecting the egg from the donor mare and putting it into the recipient mare, and then you are inseminating the recipient mare. So fertilization actually takes place inside the recipient mare, and early embryonic development also takes place in that recipient mare.

**LS: In the case of oocyte transfer, are you transferring the egg into the oviduct of the recipient mare?**

MF: Yes.

**LS: At what age do mares start to experience DNA problems with the oocytes?**

MF: I don't know that we have studied that, but when you look at the oocyte transfer data from commercial labs, mares over 20 years old give you consistently lower pregnancy rates with oocyte transfer, so, for sure after 20. Some mares start having uterine problems around age 15.

**LS: You mentioned that if you have a mare that dies, being able to harvest the ovaries. How is that done, and how much time do you have?**

MF: You would have to do it as soon as possible. You would have to collect both ovaries, and then what I would do is call the lab that is going to process these because they all have different requirements. For example, the lab may ask you to put the ovaries in a styrofoam box at room temperature, and ask you to add two one-liter saline bags that you would heat up to 37 degrees C, and put those into the styrofoam box, and that would keep the right temperature. And then you need to ship them overnight at the latest, but ideally you need to ship them counter to counter so they will get to the lab that same day.

**LS: How many hours do you have from the time the mare dies until the ovaries arrive at the facility?**

MF: Ideally between 2 and 6 hours, but no more than 12.

**LS: What about in the case where the mare needs to be euthanized? Do the ovaries need to be harvested first? Will the euthanasia drugs harm the ovaries?**

MF: No. The main limit to success is what the mare had on her ovaries when she died. If she's in diestrus, she might not yield that many viable oocytes. If she was in heat and had a nice mature follicle, then maybe you have better chances.

**LS: So you might have more or less success depending on what time of year you harvest the ovaries?**

MF: Yes. So if she's in diestrus, if she's not in heat, and she has only small follicles, we can mature some of those eggs in vitro, but the success is lower than when you have in vivo matured eggs.

**LS: When you harvest the ovaries from the mare, do you have to mature the eggs all at once and fertilize the eggs all at once, or can you store the ovaries?**

MF: You have to harvest any eggs all at once. At this point, that I am aware of, we don't have any protocols to freeze oocytes. So you would have to harvest what you can and try to mature as many oocytes as possible, and then fertilize them all as soon as you can. You have to coordinate that with the stallion that you want, and have the semen shipped.

**LS: In the case of harvesting the ovaries, are you using an ICSI procedure, or are you using oocyte transfer?**

MF: It depends on the labs, and what each lab is best at doing. Some labs will prefer to do oocyte transfer, and some labs will prefer to do ICSI.

## MARE FERTILITY

**LS: At what age can you start breeding a mare either naturally, by ET, or by ICSI?**

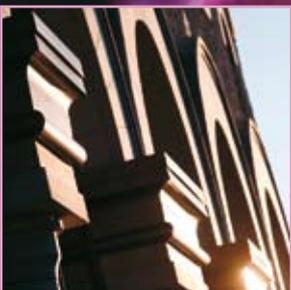
MF: With ET and ICSI, there are no limitations of age. As soon as a mare starts cycling and ovulating, you can do ET or ICSI. If a mare is fully mature at two, you may be able to start breeding [naturally] that early. Some mares will take a little longer, maybe three, but at three it is generally a safe time as long as you can provide adequate nutrition. You have to keep in mind that she'll be pregnant and that she'll be growing herself too.

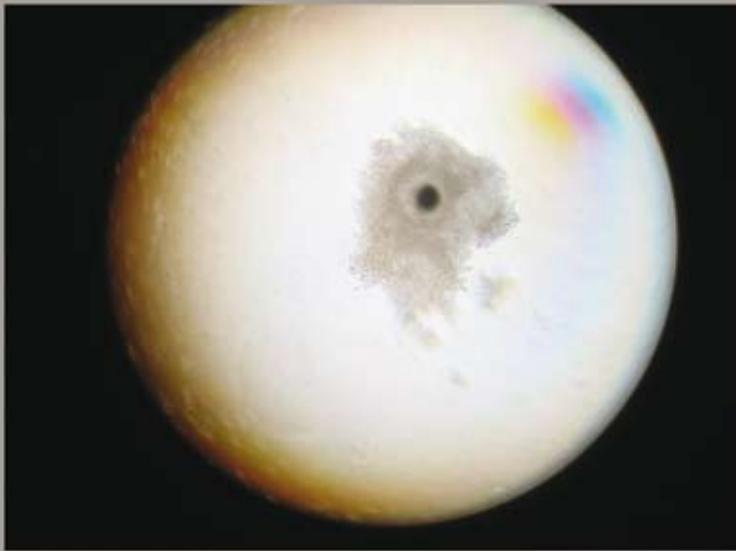
**LS: When diagnosing a chronically infertile mare, where do you start?**

MF: It's the same as with stallions. You start with a good history. Most of the time, we will get 70% of the diagnosis from what the clients are telling us about that mare.

**LS: Would you explain how cultures, cytology, and endoscopy are used?**

MF: They are all uterine procedures, so we take samples from





*Above and right: an equine oocyte*

the uterus. The culture will tell you if there is a bacterial infection. We are culturing the bacteria and we are growing those bacteria, and it will tell you which bacterium is growing and what [drug] it's sensitive to, so you can know what to treat the mare with. The cytology will confirm that there's actually an inflammatory process, so you'll see inflammatory cells. So what we do is we take a sample of cells of the lining of the uterus, and we'll see the inflammatory cells if there is an endometritis. Sometimes we can see the yeast or the fungi. You could potentially have an idea of the stage of the estrus cycle by looking at the changes in those cells, and ideally they would match what you see on your ultrasound. If the mare is in heat, she will have nice tall columnar cells. So you'll ideally match the uterine environment with the endocrine environment. There are mares that don't match, and they tend to have lower fertility too. The endoscopy allows us to see that lining of the uterus. So if you suspect that there is a mass, a foreign body, then you can do an endoscopy and look at that.

**LS: How do you diagnose whether there is a problem with the oviducts? Are there any ways to tell if there is a blockage or a problem?**

MF: There are a few. They are all surgical. But yes, you can

flush the oviducts to see if there is a blockage or not. It has to be surgical though. You cannot go through the uterus because you have this otero-tubal junction, which is a papilla; it is a sphincter so it doesn't allow fluids to go from the uterus into the oviducts. So you actually have to catheterize the oviducts, but it can be done.

**LS: How is treating bacterial infections different from treating fungal infections?**

MF: It is easier. Most of the bacteria are contaminants from the surface, or the environment, or the vagina, so usually they are fairly sensitive to most of the antibiotics so you can treat them fairly easily with local antibiotics for three to five days and they will clear. And they are superficial, so they are just surface infections. Fungal infections can be deep-seated, so they are deeper in the tissue. It's harder to get good concentrations in that tissue of the anti-fungals, and the fungal infections are more difficult to clear. They just are not quite as easy to get rid of.

**LS: What factors predispose certain mares to different types of endometritis?**

MF: There are mares that have bad vulvar conformation. So

instead of their vulva being vertical and below the pelvic brim, they are tilted cranially. Those mares tend to have more feces, air, and bacteria aspirated into their cranial vagina, and then the bacteria can reach the uterus and cause ascending endometritis. Mares that have lacerations of their cervix, that don't close their cervix properly, they can also have ascending infections.

And there is a post-breeding endometritis. And, those are usually older multiparous mares, and their main problem is that they don't contract their uterus. They seem to have a primary problem in their myometrium, or the muscle, and it doesn't contract very well.

**LS: What causes the lacerations of the cervix? Is it from natural breeding, or is it from something else?**

MF: It's usually foaling. You can have lacerations from natural breeding, yes, or from insemination pipettes, but it is usually foaling injuries.

**LS: What predisposes certain mares to pool urine?**

MF: It is the same. It's conformation. So that cranial tilting, if they get air in the vagina that makes a space where urine can accumulate, and they also tend to have that cranial tilting of the vagina so it's just by gravity that the urine goes backwards.

**LS: Can the repro tract itself be sloped the wrong direction? For example can an older broodmare have that mechanical defect?**

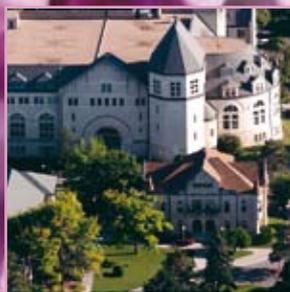
MF: It's mechanical, yes, and sometimes it's transient. You might have an older broodmare and her ligaments are all stretched. The mare might be fine when she gets pregnant, but that uterus is so heavy in late gestation that it pulls everything downwards.

**LS: By using ICSI and ET more frequently, are we breeding a new generation of subfertile horses?**

MF: Hopefully not. I guess it depends on what you use ICSI and ET for. ET was originally developed to multiply female genetics. So if you're using ET just to get more foals out of your mare then there's no reason to think you'll produce subfertile foals. Even the subfertile mares that we get that are older, a lot of those mares have a history of having eight foals, or five foals. It's just that we are breeding them longer than we used to. There are such a low percentage of horses that are being treated for subfertility with ICSI and ET that I don't think it has such an impact on conception rates.

**LS: What about hormone therapy? Does it affect the foal the mare is carrying in any adverse way? For example, are fillies out of mares treated with altrenogest less likely to be able to carry their own foals without being dependent on it as well?**

MF: No, we don't see any side effects on the fertility of the foals.



## PREGNANCY & DELIVERY COMPLICATIONS

### **LS: What is one of the most common problems that mares encounter during pregnancy?**

MF: Placentitis I think is by far the most common.

### **LS: What are some of the less common problems mares encounter during pregnancy?**

MF: Some of the least common would be ruptures of their abdominal muscles, or hydroallantois or hydroamnios; excessive production of fetal fluids.

### **LS: What causes the abdominal muscle to rupture?**

MF: There are a number of things. It's usually the older mare, the multiparous mare that has been stretching her abdomen all the time so she probably had weaker muscles already. If she has a hydrops condition, and that's excessive fetal fluids, then the uterus is heavy and they can rupture because of that. But, a lot of the times we cannot identify one reason why she ruptured. It's probably just a weakness in that wall.

### **LS: What causes hydroallantois?**

MF: Hydroallantois would be excessive allantoic fluid, and we think that's an abnormal placental function. In the hydroamnion, we think that's a fetal problem. It's the baby that is producing too much. We think that's what it is, but we don't have anything to prove it.

### **LS: Is there anything the owner or breeding manager can do to reduce the incidence of some of these problems?**

MF: Placentitis, for sure. Placentitis is usually ascending, so it goes, again, through the vulva and into the uterus and it's common in mares with bad conformation; bad vulvar conformation. But there are mares that look normal initially and once they get pregnancy the whole [repro tract] gets tilted. So breeders can keep an eye on the mare's vulvar conformation throughout the entire gestation. If they notice any cranial tilting that wasn't there before, they can call the vet to have a Caslick's done. Other than that, for prevention there is not much else but they can monitor their mare's mammary glands and if there is any early mammary gland secretion, then that's an indication that there is probably a placental dysfunction like placentitis. So they can call the vet right away and at least they can start treatment to save that pregnancy.

### **LS: What are some of the more common delivery problems in mares?**

MF: Most of the problems present during the phase when the baby is being expelled. Most common would be flexions of the neck and legs of the babies.

### **LS: What if the foal presents back legs first? Is there any chance to reposition those foals, or do they have to come out backwards?**

MF: If it's presenting backwards, then it has to come out

backwards and right away because that umbilical cord gets compressed against the pelvis and the baby starts breathing inside of the uterus and he'll die. And after he is out that baby will probably need some help from your vet.

### **LS: What can the owner or attendant do to be prepared for foaling?**

MF: I think what helps the most usually is when foaling, know what to do, and ask a lot of questions; recognize when the pregnant mare has problems. With post-partum mares, some people don't realize the importance of continuing to watch the mare. If she has fevers, if she's not eating well, or if she has a bad discharge or smells bad, those are indications that there might be something serious.

### **LS: What are some of the routine things that the attendant needs to watch for in a post-partum mare?**

MF: Make sure the placenta gets passed within three hours of foaling. If it's more than three hours then the placenta is retained, and that's an emergency. For the first week at least, watch the mare's general attitude, and make sure she's eating, and that she's not acting depressed or colicky. Make sure there are no signs of fever, and that her gums look nice and pink, and that the gums are not pale or dry. Make sure she has milk for the baby. Make sure there is no brown or yellow discharge. If any of those symptoms are there, then the most common condition is metritis, which is an infection of the deeper layers of the uterus. The mares can also rupture their arteries and bleed, so there are a number of conditions that can happen in the post-partum period that tend to be emergencies.

### **LS: And what are some of the routine things to look for early on with the foal?**

MF: Once the mare foals, the foal needs to stand up within an hour, and nurse within two hours. Their usual routine is that they go up to the mare, nurse, then go back to sleep. Every two hours at least you should see a foal nursing. If you see a foal that is lying down and he is not nursing, and you come back two hours later and the foal is still lying down, then there is a problem. Also, you need to disinfect the umbilical cord with some chlorhexidine. Make sure you check on the cord at least once a day for that first week. Check the IgG within 24 hours if you're going to be a little more serious.

### **LS: Do some people routinely do the IgG test?**

MF: Yes. It's good because you can do the IgG test with 24 hours, or even within 12 hours. And, I usually ask people to save their placentas. You can look at the placenta and tell if either there is a piece missing, or there are signs of insufficiency, because maybe the foal looks fine today, but he's hypoxic and he won't be fine tomorrow. Or maybe there are signs of placentitis and the foal needs to be treated.

### **LS: So maybe the mare could either have had a bit of premature separation, or placentitis, and it wasn't noticed**

**right away, and that would make the foal more predisposed to having trouble?**

MF: Yes, or sometimes older mares that have fibrosis have placentas that don't develop as well. So the foals may not have had enough oxygen throughout gestation, and when they are born sometimes they look normal. But, after that first day they start going downhill. So if you see a placenta that doesn't look normal, then you can identify the compromised foal and treat the foal before it starts going downhill.

## AGED MARES

**LS: What were some challenging or less common fertility cases you had involving older mares?**

MF: Blockages of the oviduct are probably the most uncommon. We had one mare (although we never did a laparoscopy) that we think had blockage in one of the oviducts because we never were able to get embryos when she ovulated on one side, but we got embryos on the other side. Most of the challenging cases are the 20 year old mares with post-breeding endometritis that take you five days of flushing and oxytocin every two hours, but they do get pregnant. It's just the amount of work that you have to put into them. As soon as you know what you're going to encounter, then you can work to get things properly done with that mare, to get that mare pregnant.

**LS: If you had an older mare who you suspect of having a blocked oviduct, would it be practical to remove the one ovary from the side you suspected to be blocked, and then try to do one of these procedures we discussed earlier with oocyte transfer or ICSI? Is it OK to remove just one?**

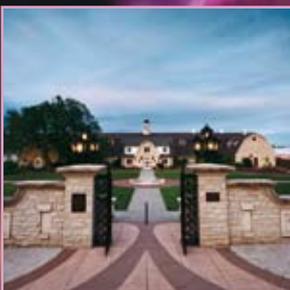
MF: It's OK. And then you know that she'll ovulate all the time on the side that has a functional oviduct. And there are ways of unblocking the oviduct with prostaglandin E, so that might be something that you can try before you get more drastic and remove the ovary.

**LS: What is fibrosis, and is it more common in older mares?**

MF: They get fibrous tissue. They get degeneration of the lining of the uterus, the endometrium. They need to have a good endometrium for that placenta to be able to interdigitate with, to exchange nutrients and oxygen. And yes, it's more common in older mares. And that's what the pre-breeding biopsy will tell you-if there is fibrosis, and what chances she has of carrying the foal to term.

**LS: When are working with fertility problems in older mares, how does Cushing's Disease or equine metabolic syndrome affect the mare?**

MF: They tend to have more irregular cycles. But there is nothing static. Those are all clinical impressions.



**LS: What might be different in the field of theriogenology 10 or 20 years from now compared to today? For example, will some of these procedures be more cost effective?**

MF: Yes, certainly I think it would be more cost effective, because we have seen a lot of improvements in the past few years in fertilization rates, in culturing the embryos, and in maturation of the eggs. Many years ago we could not mature the eggs in vitro. I think ICSI will get better with time. Hopefully somebody will come up with a way of freezing the eggs so that we can store the oocytes. There is a lot that has been done lately on fetal monitoring and management of high risk pregnancies. Many years ago we didn't have all the tools that we have today. Hopefully these techniques continue to improve.

**LS: What were some of your most rewarding moments**

**with your job?**

MF: I think the most rewarding parts of my job are probably the small simple things, like when you finally get that 20 year old mare that has been open for two years pregnant, and you see the owner's expression when you tell them that there's a baby in there. Those are simple things, everyday things, but good. Just seeing the baby that's just a little black spot now, but that's going to be a foal in a few months and have legs... those simple things, I think, make your day and your life!



Article by *Laurie Schmelzle* of Al Badia Arabian Stud, USA

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Background image: A redbud tree in spring bloom

Inset images: Scenes from the KSU campus

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