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**MENOPAUSE ...AND
WILD HORSE MANAGEMENT**



DR BRUCE NOCK, MS, PHD

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Menopause & Wild Horses

Menopause is a natural biological process. Even so, the physical and emotional consequences can be so severe some women seek hormone replacement therapy despite warnings of potential health risks. Sleep disruption, hot flashes, loss of energy, night sweats, insomnia, mood swings, headaches, dizziness, heart palpitations, sexual disinterest, joint stiffness, weight gain, depression, anxiety, irritability, urinary incontinence and so on are all listed as potential consequences of menopause. In addition, postmenopausal women are at increased risk for osteoporosis, heart disease, macular degeneration, glaucoma and colon cancer.

Menopause is generally defined as the permanent end of menstruation and fertility. However, it might be more accurately defined by the cessation of ovarian function. Most importantly for this discussion, it is associated with a reduction in the synthesis and release of estrogens, e.g., estradiol-17 β , and progestins, e.g., progesterone.

It is the decline in the levels of these ovarian hormones that cause trouble for so many women. And, of course, it is these hormones that hormone replacement therapy restores.

You might be wondering what this has to do with wild horse management, right? Let me explain. In 2010, the Bureau of Land Management (BLM), raised the possibility of gelding males (removing their testes) and spaying females (removing their ovaries) before returning them to the range.¹ Now, they have once again proposed spaying females as a method to control wild horse populations. Technically speaking, horses have estrus cycles, not menstrual cycles.² Nevertheless, spaying removes the primary source of estrogens and progestins from the body, just like menopause, and there is no reason to believe the consequences are less severe for mares than they are for woman. In fact, for woman the surgical removal of the ovaries results in more severe symptoms of menopause, because in natural menopause the ovaries continue to produce low levels of female hormones. It is hard to imagine that removal of these hormones from the body by spaying won't compromise a mare's ability to survive and thrive in the wild.

You see, the ovarian hormones are powerful steroid hormones. They have widespread effects on physiology and behavior. Estrogen, for example, is essential for

¹ Working Toward Sustainable Management of America's Wild Horses and Burros: Draft Goals, Objectives and Possible Management Actions, Bureau of Land Management, Department of the Interior, June 2010.

² If conception does not occur during a cycle, animals that have menstrual cycles slough off the uterine lining during menstruation, whereas animals that have estrous cycles reabsorb the uterine lining. The function and components of the reproductive endocrine system, the hypothalamic-pituitary-gonadal axis, are essentially the same.

healthy bone. When estrogen production declines due to menopause, whether naturally occurring or surgically induced, or after exposure to radiation or chemotherapeutic drugs, bones become brittle and break easily. Spaying mares is likely to have similar effects on bones density and strength. I wonder, does the BLM really think returning mares to the open range in a condition associated with the increased risk of breaking bones is a good idea? Have they given it any thought at all? The image of a horse suffering with a broken leg on the open range due to compromised bone density isn't a pretty one.

Ovarian hormones also influence many neural circuits throughout the brain by binding to transcription factors which regulate the activity of certain genes.³ In addition to the hypothalamus and other brain areas related to reproduction, they affect the activity of serotonin pathways, catecholamine neurons, and the basal forebrain cholinergic system. They influence the functioning of the hippocampus, a brain region involved in spatial and declarative memory. Ovarian steroids also have measurable effects on affective state, e.g., mood/emotion, and cognition ... the mental processes involved in learning, memory, problem solving and decision making. They affect cardiovascular health and immune function. And, anyone who has watched mares in "heat" might guess, ovarian hormones have potent effects on social relations too ... an

³ My PhD thesis research at the Institute of Animal Behavior, Rutgers University, focused on the regulation of these transcription factors in brain by neurotransmitter systems: Nock, B.: Noradrenergic Regulation of Female Sexual Behavior and Hypothalamic Steroid Receptors, PhD Thesis, Rutgers University, 1980.

effect incompatible with the BLM's goal of creating a "thriving natural ecological balance" for the wild horses (see ⁴).

But, taking out the ovaries doesn't just remove ovarian hormones from the body. There's more to it ... a lot more. It affects other endocrine systems as well. Even forty years ago endocrinologists appreciated the subtle intricacies of endocrine system function and the complexities of hormone interactions. My endocrinology professor in graduate school, Dr. Alan Leshner PhD, drove home time and again the point that "No hormone works independently of other hormones." Take away one hormone and it affects the levels of other hormones too. Remove ovarian hormones and pituitary hormone releasing and inhibiting hormone activity changes, gonadotropic hormone levels go up, adrenocorticotrophic hormone levels go up, cortisol levels go up, thyroid hormone levels go down, and so on and so on. It's a fact. Moreover, the assessment of the long-term consequences of such hormonal imbalances requires in-depth, long-term comprehensive field studies by professional scientists ... individuals trained and experienced in the art and science of science. Veterinarians don't currently know the consequences. BLM personnel don't currently know the consequences. The National Science Foundation doesn't currently know the consequences. But, it is reasonable to suggest based on what we do already know that spaying is likely to have serious consequences for a mare's ability to survive and thrive on the open range.

⁴ Nock, B.: Wild Horses and Ecological Balance. Liberated Horsemanship Press. Commissioned by The American Wild Horse Preservation Campaign.

So, the idea of spaying mares as a method of population control doesn't sit well with me when I think beyond how it impacts reproduction. I'm also skeptical about whether it can be done safely in the field. Taking out the ovaries which reside in the abdominal cavity is a much more serious procedure than removing the testes of a male. When we ovariectomize rats for research, we do it in a state-of-the-art animal facility. We're required, by federal law, to use sterile procedures and defined recovery and followup protocols. I'm wondering, can and will the BLM, a federal agency, adhere to the practices the federal government requires us to follow for rats when removing the ovaries of horses in the field? I seriously doubt it is possible.

Even if such precautions are effectively implemented, I doubt the wisdom of returning spayed horses to the open range when bone health, mental and emotional processes and social behaviors have been compromised. The endocrine system is one of the major signaling systems of the body and ovarian hormones are major components. They are powerful agents which function to coordinate behavior and physiology. Inducing what could be described as physiological chaos by removing ovarian hormones and disrupting the normal functioning of neural and other endocrine systems to boot is very likely, in my opinion, to compromise a mares ability to thrive as a fully integrated herd member. *Bruce - 314-740-5847 Bruce.Nock@mac.com*

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