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## **Saliva steroidome and metabolome in mare during anestrus, estrus cycle and gestation**

Stéphane Beauclercq<sup>1</sup>, Cécile Douet<sup>2</sup>, Antoine Pianos<sup>3</sup>, Léna Haddad<sup>3</sup>, Fabrice Reigner<sup>4</sup>, Philippe Liere<sup>3</sup>, Lydie Nadal-Desbarats<sup>5</sup>, Ghylène Goudet<sup>2</sup>

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Precision livestock farming using omics approach such as metabolomic and steroidomic to acquire precise and real-time data can help farmers in individual animal management and decision making. Moreover, saliva collection is a non-invasive, painless and easy sampling method. Thus, this prospective study proposes a metabolomic and steroidomic analysis in mare saliva during reproductive stages, in order to identify salivary biomarkers to detect their reproductive stage in a welfare friendly production system. Saliva samples from 6 mares were collected in anestrus, in the follicular phase 3, 2 and 1 day before ovulation and the day when ovulation was detected, in the luteal phase 6 days after ovulation and in gestation 18 days after ovulation and insemination. Metabolome and steroidome analysis were performed by <sup>1</sup>H-nuclear magnetic resonance spectroscopy and gas chromatography coupled to tandem mass spectrometry, respectively. We identified 59 metabolites and 25 steroids in saliva. The salivary concentrations of metabolites were significantly different between the anestrus stage and another stage (n = 11 metabolites or group of metabolites), between follicular phase and gestation (n = 1), between the day of ovulation and the luteal phase (n = 1), during the 4 days until ovulation (n = 4). The salivary concentration of pregnenolone during gestation was significantly higher than during anestrus or follicular phase and tended to be higher than during luteal phase. Most of the 5 $\alpha$ -reduced metabolites of progesterone showed higher salivary concentrations during the luteal phase and gestation compared to anestrus and follicular phase. These metabolites and steroids could be potential salivary biomarkers of the reproductive stage of the mare. They could allow to easily detect their reproductive stage for real-time decision making at the individual animal level. Further studies with a greater number of animals are in progress to confirm the reliability of these candidate biomarkers.

17/2/23:

Dear Dr Goudet,

Thank you for submitting your abstract, we have received your contribution for EAAP Annual Meeting 2023, Lyon, France in good order.

Abstract no.: 41237

Abstract title: Saliva steroidome and metabolome in mare during anestrus, estrus cycle and gestation

Author: Beauclercq, S., Douet, C., Piano, A., Haddad, L., Reigner, F., Liere, P., Nadal-Desbarats, L., Goudet, G.

Preferred presentation: Poster

Preferred session: 82: Alternatives to hormones, antibiotics, dewormers and chemical inputs in (equine) breeding and production

Abstract text:

Precision livestock farming using omics approach such as metabolomic and steroidomic to acquire precise and real-time data can help farmers in individual animal management and decision making. Moreover, saliva collection is a non-invasive, painless and easy sampling method. Thus, this prospective study proposes a metabolomic and steroidomic analysis in mare saliva during reproductive stages, in order to identify salivary biomarkers to detect their reproductive stage in a welfare friendly production system. Saliva samples from 6 mares were collected in anestrus, in the follicular phase 3, 2 and 1 day before ovulation and the day when ovulation was detected, in the luteal phase 6 days after ovulation and in gestation 18 days after ovulation and insemination. Metabolome and steroidome analysis were performed by <sup>1</sup>H-nuclear magnetic resonance spectroscopy and gas chromatography coupled to tandem mass spectrometry, respectively. We identified 59 metabolites and 25 steroids in saliva. The salivary concentrations of metabolites were significantly different between the anestrus stage and another stage (n = 11 metabolites or group of metabolites), between follicular phase and gestation (n = 1), between the day of ovulation and the luteal phase (n = 1), during the 4 days until ovulation (n = 4). The salivary concentration of pregnenolone during gestation was significantly higher than during anestrus or follicular phase and tended to be higher than during luteal phase. Most of the 5 $\alpha$ -reduced metabolites of progesterone showed higher salivary concentrations during the luteal phase and gestation compared to anestrus and follicular phase. These metabolites and steroids could be potential salivary biomarkers of the reproductive stage of the mare. They could allow to easily detect their reproductive stage for real-time decision making at the individual animal level. Further studies with a greater number of animals are in progress to confirm the reliability of these candidate biomarkers.

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