VeO®Premium

The brain Revealed Modulation of stress and Regulation of Feed Intake by PET

应用PET扫描揭示诱食源对大脑的调控

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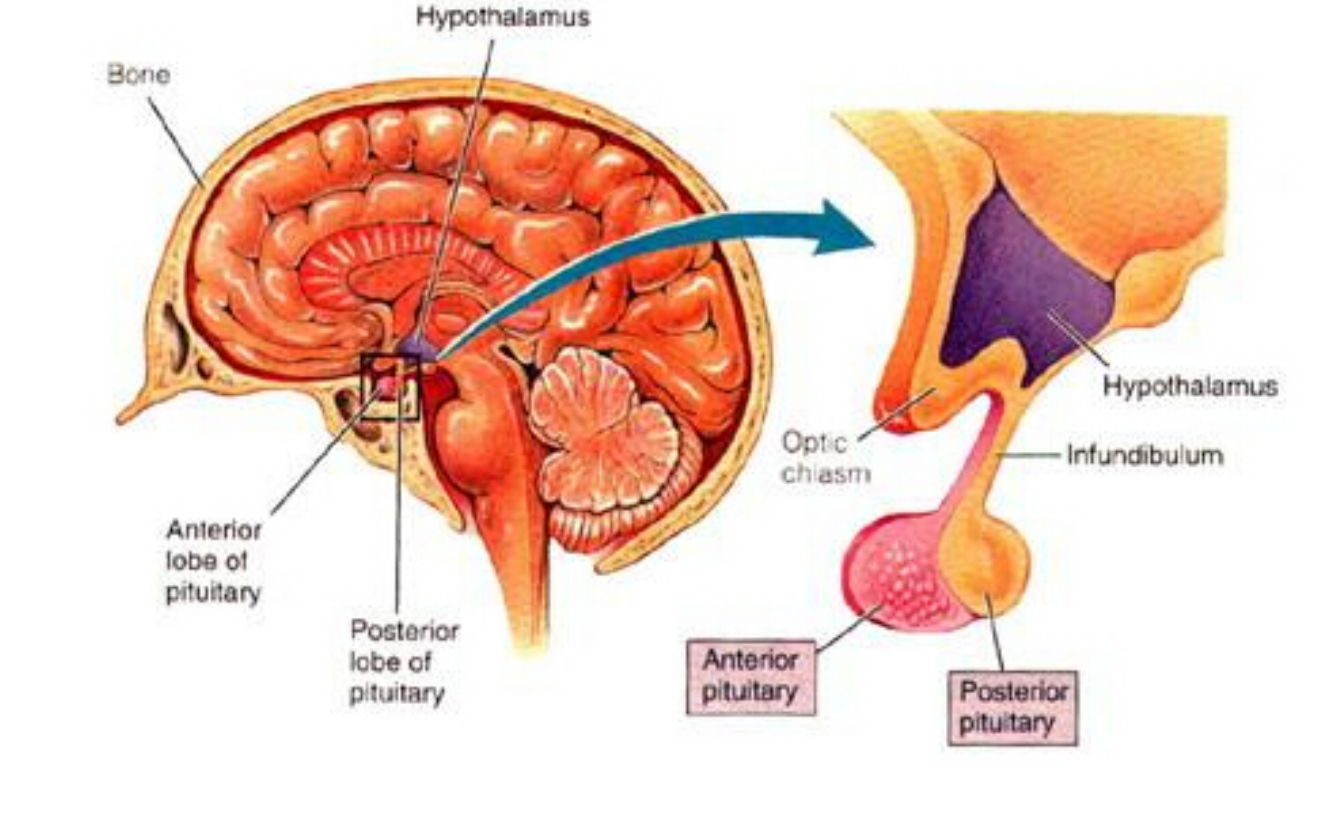
Structure of the Brain
大脑的结构

脑核 （Central Core）	脑缘系统 （Limbic System)	大脑皮质 （Cerebral Cotex)
呼吸、心跳、运动 睡眠、平衡及 早期感觉系统等	行为、情绪、记忆 体温、血压、血糖	高级认知和情绪功能（4个脑叶和9个功能区）

下丘脑

应激管理、体温调节、能量分配

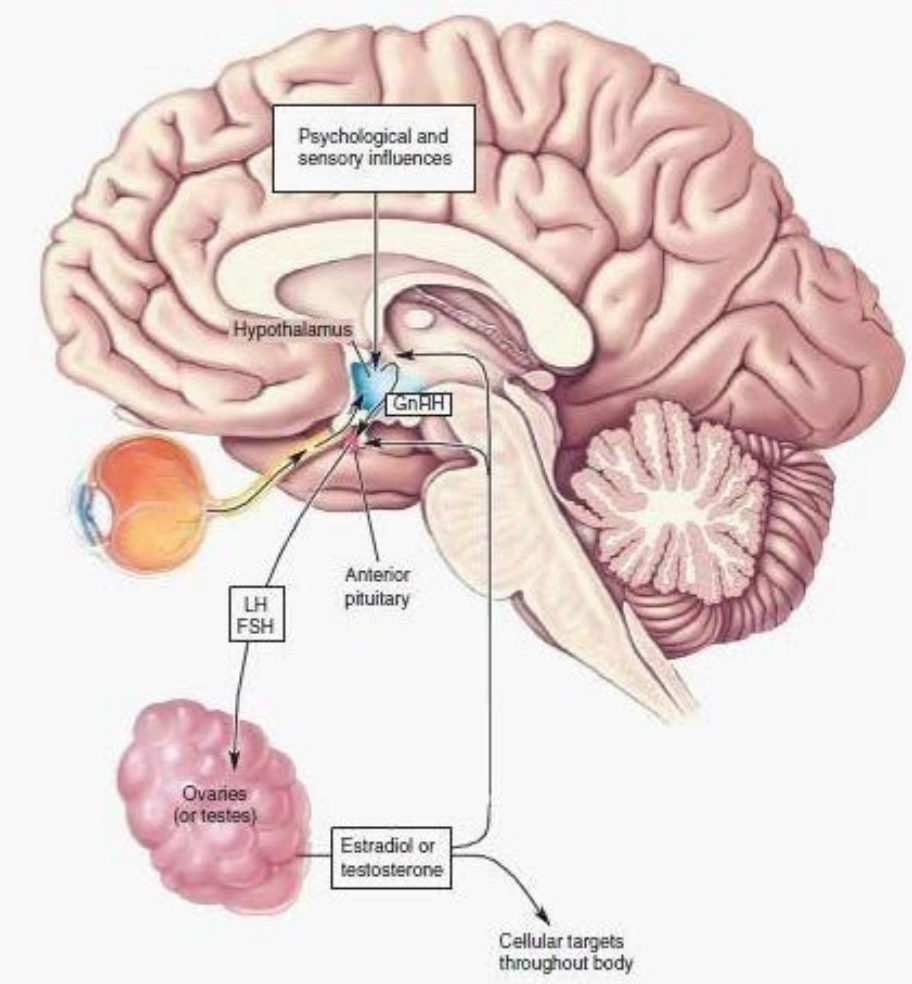
Hypothalamic 下丘脑：神经内分泌的中心



下丘脑

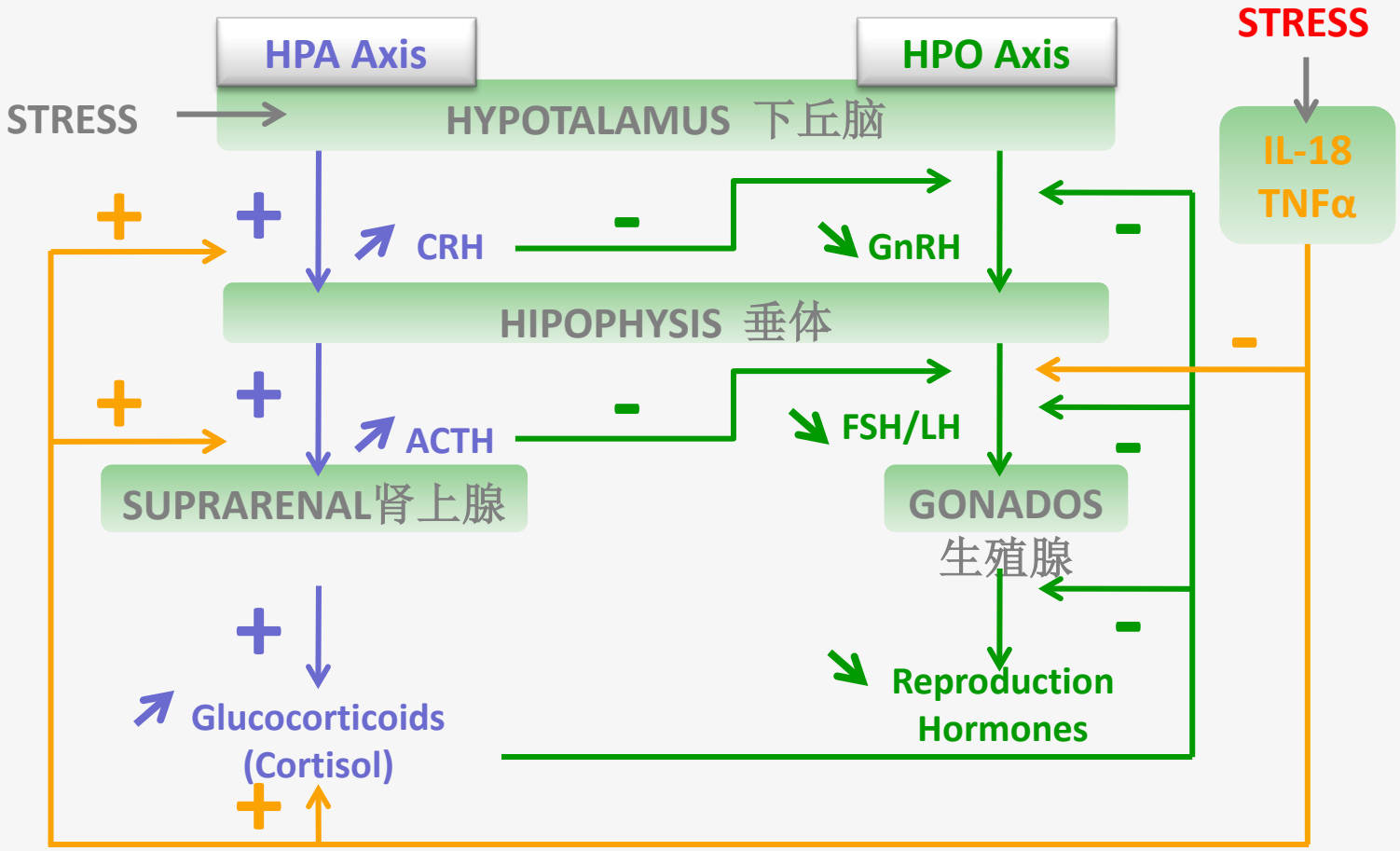
饥饿
口渴
体温
情绪波动
性唤起等

HPO: Hypothalamic Pituitary Ovarian Axis
下丘脑-垂体-性腺轴



生殖内分泌
调控核心

Stress and Reproduction 应激和繁殖的关系



HPA: Axis Hypothalamus-Pituitary-Adrenal
CRH: Corticotropin Releasing Hormone
ACTH: Adrenocorticotropic Hormone

HPO: Hypothalamic Pituitary Ovarian Axis
GnRH: Gonadotropin Releasing Hormone
FSH: Follicle Stimulating Hormone
LH: Luteinizing Hormone

IL-18 TNF α: C Pro inflammatory Cytokines

Reference: Chatterjee & Chatterjee, 2009

Stress in animal production : definition
动物生产中的应激：定义

- **Acute stress = violent stress and time-bounded**

  急性应激=暴力应激和时间约束

- **Chronic stress = moderate aggressions but repeated and in quick successions**

  慢性应激=长期反复的温和的侵害

  - Chronic stresses related to its environment = competition with others, density, housing conditions, noises, variations of temperature (heat stress)…

    慢性应激与环境相关=与其他个体的竞争，饲养密度和环境，噪音，温度的变化（**热应激**）等

Stress and Production – 1　应激和生产-1

- **Stress mobilizes body reserves at the expense of yield (fattening, milk, egg ...). 应激以降低产量为代价（育肥，产奶，产蛋）动员机体的储备**

  - Adrenaline stimulates gluconeogenesis and lipolysis. A chronic increase of circulating glucocorticoids induce proteic catabolism

    Reference: The biology of animal stress: basic principles and implications for animal welfare, CABI Publishing, 2000: 45-76.

    肾上腺素促进葡萄糖异生和脂类分解。慢性应激增加了糖皮质激素在体内的循环从而诱导蛋白的分解代谢。

  - An acute stress reduces milk production in cows, by inhibiting the release of oxytocin, the hormone of milk excretion synthesized in the hypothalamic neurons.

    Reference: Applied Animal Behaviour Science 2001; 73(1): 1-14.

    急性应激降低了产奶量，这是因为急性应激抑制了下丘脑神经元中合成的能够促进泌乳的激素——催产素的释放。

Stress and Production – 2　应激和生产-2

- **Stress suppresses the appetite. 应激可以抑制食欲。**
  - A confined space less than 0.1 m^2 per pig in swine production reduces the voluntary intake of 50 g / day.

    Reference: Voluntary Food Intake and Diet Selection in Farm Animals, CAB International, 1995: 332-353.

    在养猪生产中，每头猪的活动空间每减少**0.1 m^2 采食量降低50g/天**。
  - Human cortisol increases the Leptin level in plasma, a neuropeptide of satiety.

    Reference: Archives of General Psychiatry 1998; 55(11): 995-1000.

    人类皮质醇增加了血浆中瘦素的水平，**瘦素**是一种能产生饱腹感的神经肽类物质。

Stress and Reproduction 应激与繁殖的关系

- **Measurements related reproductive outcomes related with behavioral indicators show the link between stress and reproduction in animals.**

与繁殖力紧密相关的数据与一些行为紧密相关，这说明了动物的繁殖力与应激反应有关联性。

- Social status degradation of a cow in a herd leads to a decrease of their reproductive compared with other cows.

Reference: Animal Reproduction Science, 2000; 60: 743-752.

牛只在牛群中社会地位的降低会导致这些牛只繁殖水平的降低。

- Stress affects female fertility by modulating at the hypothalamic level the secretion of LH (luteinizing hormone). Cortisol suppresses pituitary sensitivity to GnRH.

Reference: Endocrinology, 2004; 145: 692-698.

应激通过调节下丘脑释放LH的量从而影响雌性的繁殖力。皮质醇抑制了脑垂体对GnRH的敏感性。

Stress and Health 应激和健康

- **Stress can impair the immune system and thereby increase the sensitivity of animals to pathogens.**

  应激会损伤免疫系统，因此会增加动物对病原菌的敏感性。

  - The specific immune response is inhibited: the cytotoxic activity of lymphocytes is inhibited after 4 hours pigs containment.

    Reference: Brain, Behavior, and Immunity, 2001; 15(1): 54-64.

  特殊的免疫应答被抑制：在把猪只放在密闭的环境中4小时后，淋巴细胞杀死细胞毒素的活性被抑制。

  - Altering groups of pigs (re-accommodation) 3 days after an antiviral vaccination inhibits the development of a specific immune response.

    Reference: Physiology & Behaviour, 2001; 73: 145-158.

  在接种抗病毒疫苗三天后对猪只进行调群，人们发现这种调群抑制了特殊免疫应答反应的发展。

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NATURAL EXTRACTS;
OLFACTION AND STRESS MANAGEMENT

天然提取物；气味和应激管理

应激状态下

更稳定采食量；更低维持体温；更高奶产量（奶牛/母猪）

Our expertise: “The brain effect”
我们的专长：“对大脑的影响”

From the beginning of time …

All living beings have a common ancestral brain managing **the innate behavior of survival**.

The “brain effect”

Hypothalamus

Oropharyngeal Receptors

Modulate Nervous Message of Stress

Regulate Feed Intake

ingredients of VEO from plant extract
诱食源中的有效植物提取物成分

- D-limonene, or essential oils that include it (citrus) has an anxiolytic effect, whatever the route of administration: by oral or by air.

柑橘中的右旋柠檬烯和精油有抗焦虑的功能，无论以口服或是在空气中传递的方式

Reference : Brain Research 2004; 1001: 78-86.
Behavourial Brain Research 2006, 172: 240-249.
Biol. Pharm. Bull 2002; 25(12): 1629-1633.
Rejuvenation Research 2008; 11(2): 399-407

Lavender volatile molecules allow to decrease levels of cortisol in blood in children subjected to a stress when blood sampling is done.

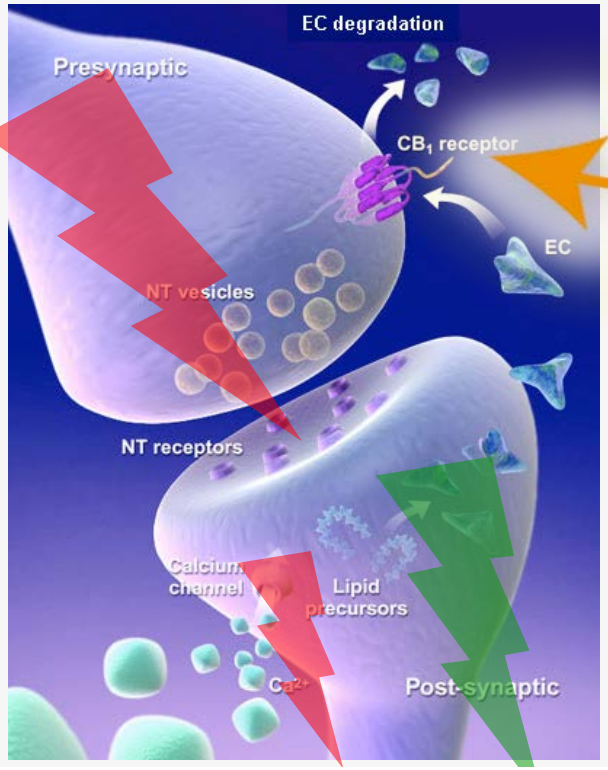
薰衣草中的挥发性分子可以降低血中皮质醇的含量。

Reference : Infant Behavior and Development 1997; 20(4): 531-535.

Stress modulation & Feed Intake Regulation: VéO®

Alert message transmitted from nervous system
神经系统的信号传输

应激调控和采食调节



VéO PREMIUM

▼ Degradation rate of Endocannabinoids
内源性大麻素的降解率

▲ Endocannabinoids Concentration
内源性大麻素的浓度

Lower alert + New hunger messages transmitted to the brain
降低紧张信号，增加饥饿信号传输

↓ **Message Alert / Stress**
信号，应激

↑ **Message Appetite**
信号，食欲

促进采食的核心：
——高浓度的Endocannabinoid（EC）

高浓度EC
（内源性大麻素）

a、减少细胞钙内流，抑制Glu-NT（紧张度降低）

B、诱导低温状态（进一步增加采食 ）

c、消炎镇痛作用（哺乳动物自我保护体系之一）

d、舒张血管、降低血压（保持平稳情绪）

e、抗氧化，抑制自由基形成（VE、VC作用相当）

f、调节神经细胞发育（轴突生长和突出发生）

对抗各种应激状态

VéO PREMIUM : Specific Natural Extracts
特定的天然提取物

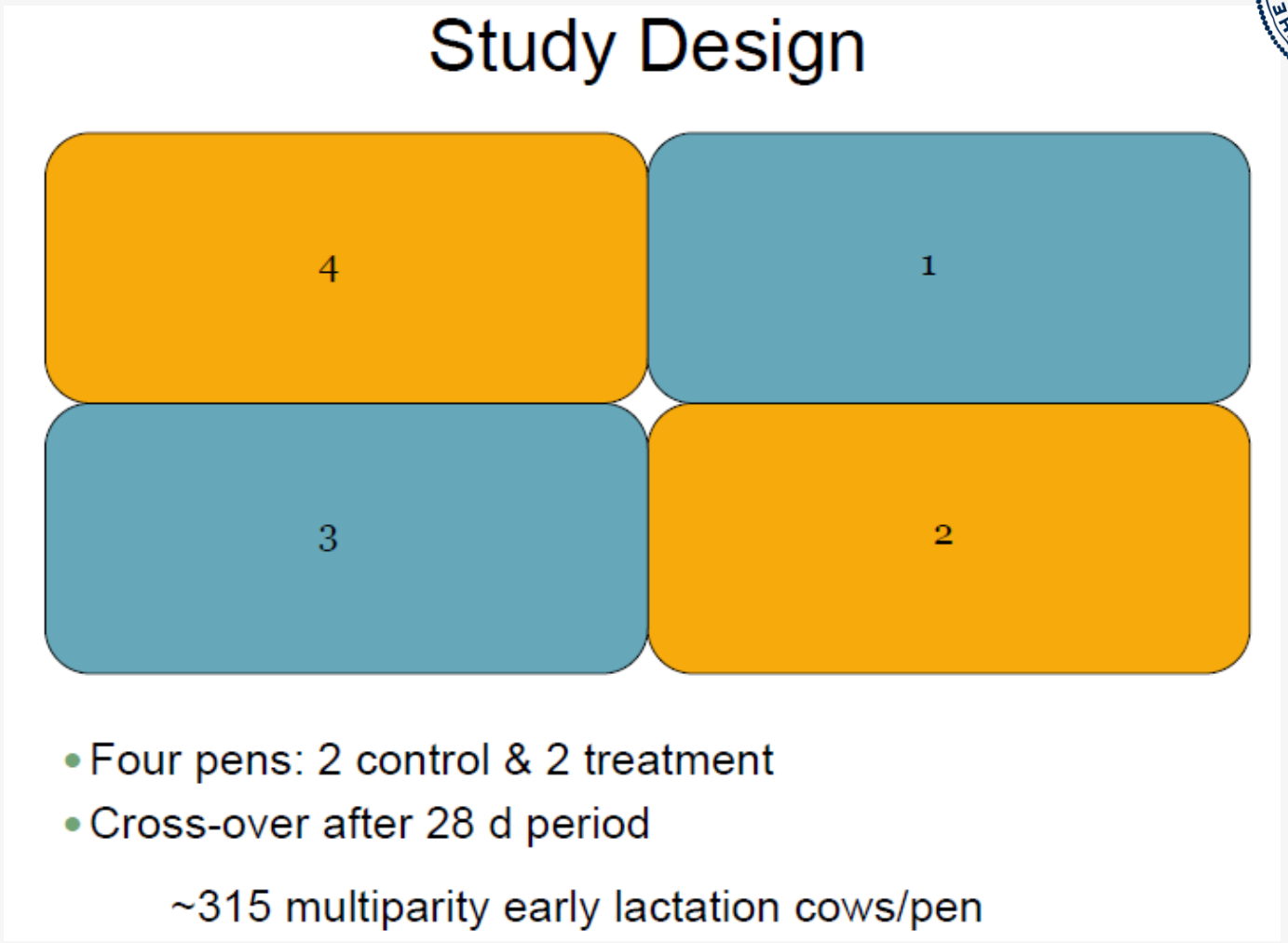
- Natural volatile substances 天然的挥发性物质
- Containing natural and purified fractions from plants extracts

  包含植物提取物中的天然的和纯化的分子
- Adapted to be included in all solid feeds 可以与所有种类的固体饲料混合
- Benefits from the edge PHODÉ's technology process

  馥蒂特有的生产工艺
- Level of incorporation: 250 g/ Ton of concrete feed (or TMR dry matter basis)

  添加量：250g/吨精料（TMR干基）

USA trial#2 – UC Davis (2011)试验2



USA trial#2 – PROTOCOL

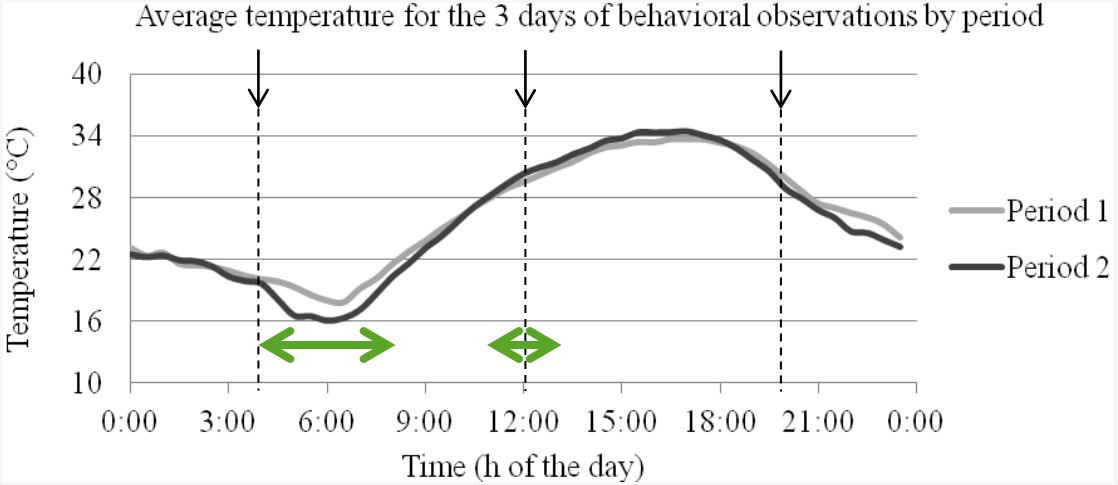
- Average observed temperature (°C) (July to Aug. 2011)

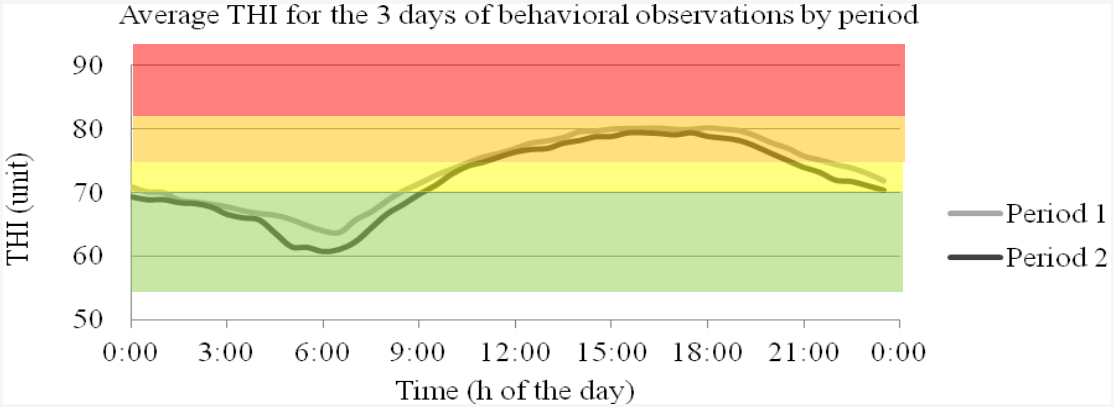
平均观测气温（7至8月，2011）

↓Milking挤奶

↔Feed supplies

饲料供应





ABSTRACT A meta-analysis was conducted on 13 farms (4197 animals) to measure the effect of Gold Rush on dairy cows performances. Feed intake was improved (+2.04 kg DMI/cow/day) and milk yield was increased (+2.78 kg/cow/day).

Trials were carried out in 4 countries: USA (4 trials), France (3 trials), Italy (3 trials) and China (2 trials). Characteristics of data used are presented in table 1.

Table 1. Characteristics of experimental herds.

	Control	Tested
Number of herds	13	13
Number of animals	2124	2073
Average days in milk, days	107	107

The average duration of the trial was 32.4 days (7 to 90 days). Holstein herds were used. The diets were corn silage based total mixed ration. The tested product was directly mixed into the feed (average dose: 4 g/head/day).

The statistical model was: $Y_{ij} = \mu + \alpha_i + \beta_j + e_{ij}$

With Y_{ij} : variable response

μ : overall mean effect

α_i : fixed treatment effect

β_j : random trial effect

e_{ij} : residual variance

The Linear Mixed Model from SPSS (release 13.0, 2004) has been used. Information criterion was restricted maximum likelihood.

USA trial#2 – Cow activity 试验2——奶牛行为

- Behaviour (Lying *vs.* standing)行为（躺卧和站立）

	Control	OE	SEM	*P*
Lying *vs.* standing (cow/100 cows)[c]				
2:45 h	53.68	68.60	0.0381	< 0.01
9:15 h	41.05	39.68	0.0376	0.79
17:30 h	33.70	27.28	0.0341	0.18

[c]The proportion of cows scored as lying (*versus* standing) based on the position in which they were found.

➔ Night: More lying cows (longer time for ruminating), (P<0.01)

夜间：更多的牛只躺卧（反刍的时间更长）

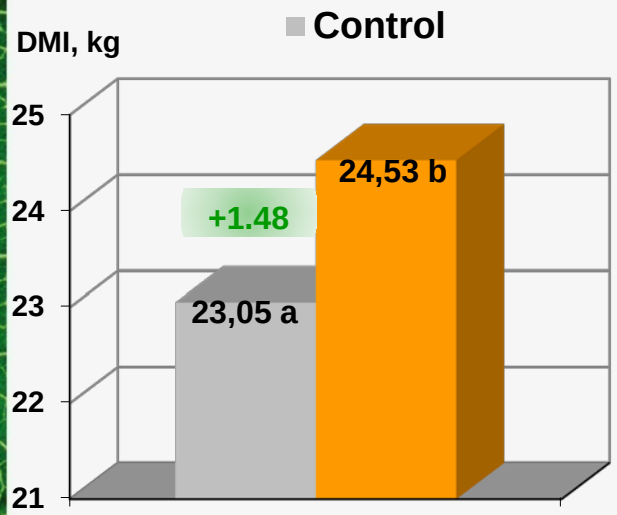
➔ Afternoon: Dairy cows with more activity, more feedings ?

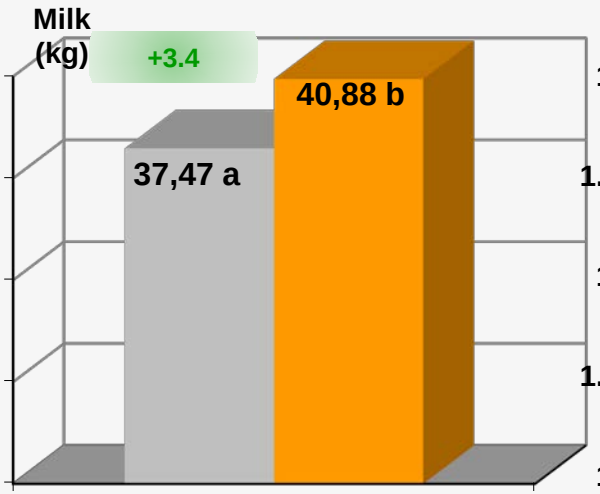
Whatever, dairy cows seemed **to be less sensitive to hottest conditions**下午：奶牛更多的活动和更多的采食，说明奶牛对热的敏感度降低。

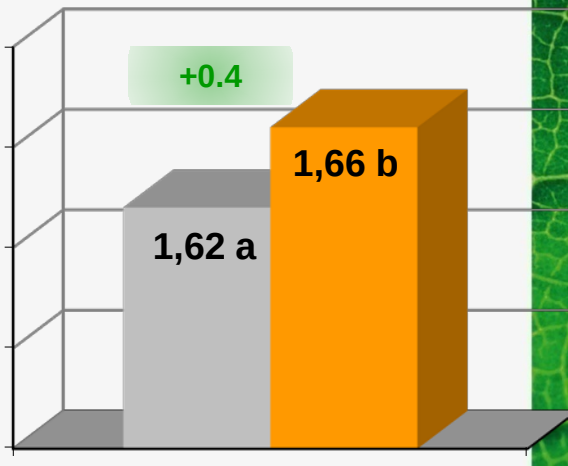
Meta-analysis, Results综合分析结果

	VéO®PREM.	Control	P
Dry matter intake, kg干物质采食量	24.53 (0.37)	23.05 (0.41)	0.001
Milk yield, kg产奶量	40.83 (2.33)	37.43 (2.30)	0.0002
Feed efficiency.饲料转化率（奶料比）	1.66 (0.069)	1.62 (0.078)	0.024

* from SPSS (release 13.0, 2004)







Meta Analysis

- 18 farms (4569 Holstein dairy cows)
- 4 g VéO® Premium/head/day for 14 months
- Homogeneous groups (Control vs Treated)
- Average milk production of 33.5 kg/day/cow

Effects of VéO® Premium on the reproductive performances of dairy cows

对奶牛繁殖水平的影响

Parameters	Control	VéO® Premium
Cows, n	2426	2143
Cows with Calving-1st Estrus Interval < 60 days	17.0%[a]	40.3%[b]
Cows with Calving-1st Estrus Interval = 60-90 days	50.8%[a]	33.2%[b]
1st AI Success Rate, %	27.0[x]	37.3[y]
Pregnancy Rate, %	77.2[a]	85.1[b]
Cows needing > 3 AI, %	26.5[a]	18.7[b]
AI/Successful AI	2.05[a]	1.80[b]

[a,b]P<0.05; [x,y]P<0.10

Effects of VéO® Premium on the reproductive performances of dairy cows

对奶牛繁殖水平的影响

Parameters	Control	VéO® Premium
Cows, n	2426	2143
Calving Interval, days	424.1[a]	402.3[b]
Calving-1st AI Interval, days	82.5[a]	65.0[b]
Calving-Successful AI Interval, days	106.0[a]	92.0[b]
Cows with Calving-Successful AI Interval > 90 days	28.3%[a]	17.9%[b]
Cows with Calving-Successful AI Interval < 70 days	18.7%[a]	41.1%[b]
Cows with Calving-Successful AI Int. = 70-90 days	38.5	26.4
Cows with Calving-Successful AI Int. > 110 days	39.9%[a]	25.0%[b]

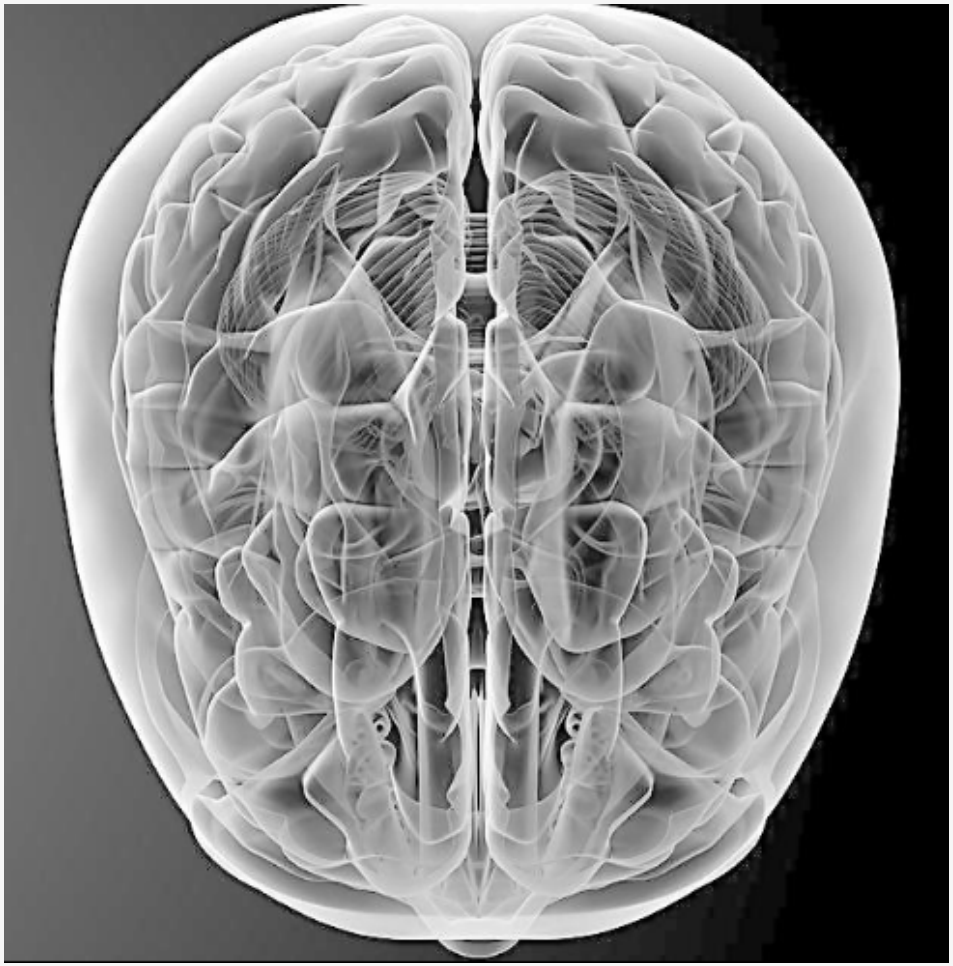
[a,b]P<0.05

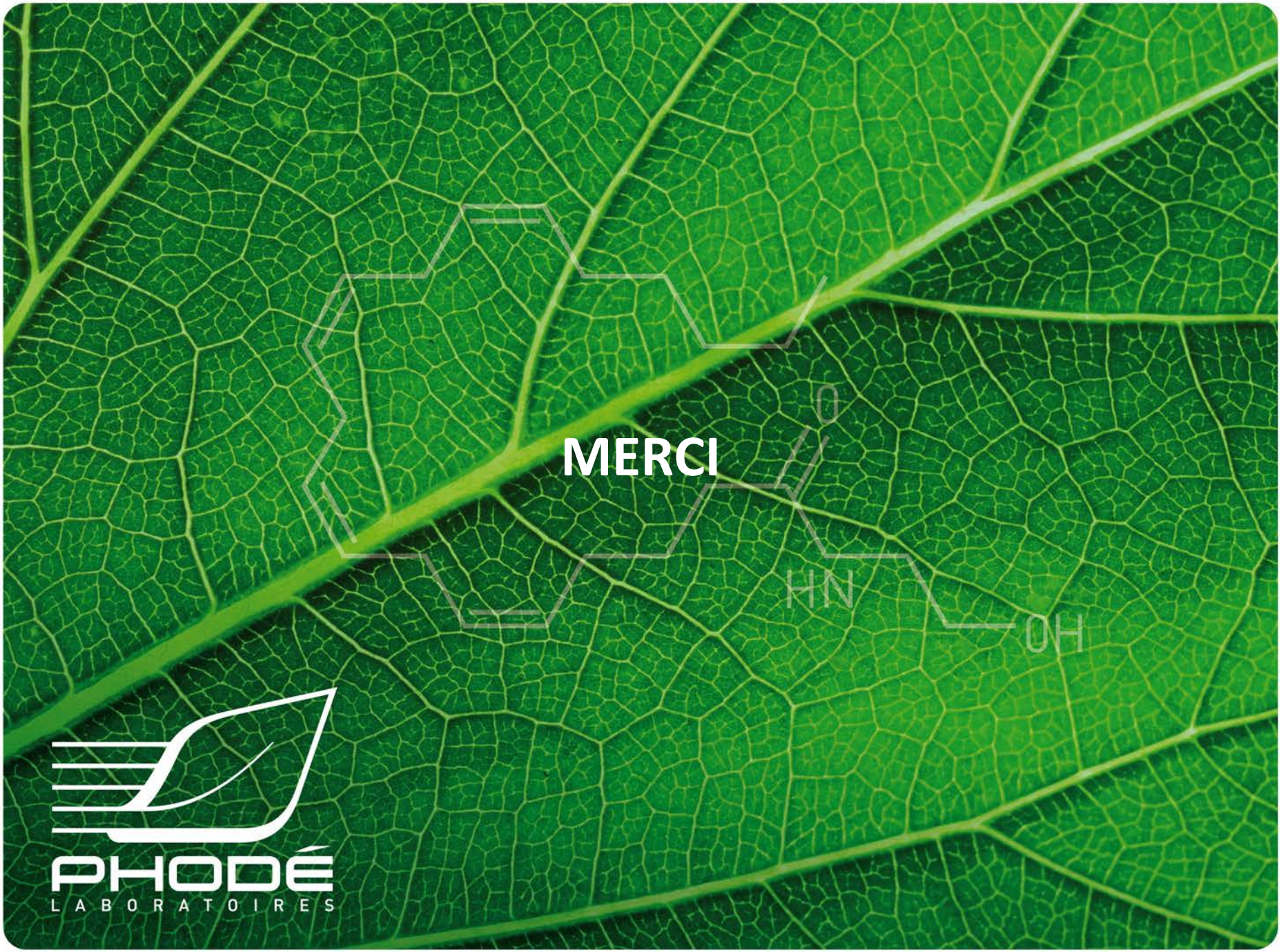
2nd Partial CONCLUSION第二部分结论

- On FERTILITY
  - More cows come in heat in the first 60 days following calving
  - Better success rate of first AI **提高首次输精妊娠率**
  - Better pregnancy rate 提高怀孕率
  - Less cows need more than 3 AI 更少的牛只需要三次以上的人工授精

- On REPRODUCTION
  - Calving interval improved **缩短产犊间隔**
  - Shorter interval from calving to first AI 缩短产犊到第一次输精的间隔
  - Shorter interval from calving to conception 缩短产犊至下次怀孕的间隔时间

Positron Emission Tomography(PET)
正电子发射断层扫描技术

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