

Kisspeptin neuron, a key player in mammalian reproduction

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Kisspeptin (first named metastin) was found as a product of the *Kiss1* gene and identified as an endogenous ligand for GPR54 in 2001. Accumulating evidence suggests that kisspeptin-GPR54 signaling has been implicated to play a key role in reproductive function via stimulation of gonadotropin-releasing hormone (GnRH) release in mammalian species. Our previous studies revealed that endogenous kisspeptin is responsible for normal estrous cyclicity and induction of luteinizing hormone (LH) surge in female rats, suggesting that kisspeptin is involved in regulating tonic (pulse-mode) and cyclic (surge-mode) GnRH/LH release.

Central distribution of kisspeptin neurons is sexually dimorphic. Kisspeptin neurons are located in the anteroventral periventricular nucleus (AVPV) and the hypothalamic arcuate nucleus (ARC) in female rats, whereas only in the ARC in male rats. The kisspeptin neurons express estrogen receptor alpha, and estrogen stimulates kisspeptin expressions in the AVPV. We recently found that neonatal castration rescues AVPV kisspeptin expression in genetically male rats, and the animals showed surge-like LH release in the presence of the preovulatory level of estrogen at adulthood. These facts suggest that the AVPV kisspeptin neurons are responsible of positive feedback action of estrogen to induce preovulatory GnRH/LH surge, and then ovulation.

On the other hand, estrogen inhibits ARC kisspeptin expression, implying that the ARC kisspeptin neurons mediate negative feedback action of estrogen to inhibit pulsatile LH release. Further, pulsatile LH release and the ARC kisspeptin expressions are profoundly suppressed in lactating rats. These facts suggest that the ARC kisspeptin neurons may play a role in GnRH/LH pulse generation. Thus, the two populations of kisspeptin neurons in the brain are closely involved in the generation of surge and pulse modes of GnRH/LH release and thereby controlling follicular development, steroidogenesis and estrous cyclicity in female rats. This research was in part supported by Grant-in-Aid from the JSPS and PROBRAIN of Japan.

Osteopontin 在公猪生殖细胞上的分布及 OPN 抗体对体外受精的影响

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摘要: 骨桥蛋白 (Osteopontin, OPN) 是一种糖基类酸性蛋白质, 富含天冬氨酸、谷氨酸和丝氨酸。在牛上大量的研究表明, 牛 OPN 蛋白是一种与繁殖力有关的蛋白, 但目前国内外对猪 OPN 蛋白研究得比较少, 本论文对猪 OPN 蛋白在生殖细胞分布、对受精影响进行了研究, 以探讨 OPN 蛋白可能对猪繁殖力的影响。通过免疫荧光的方法, 首次在猪离体精原干细胞 (SSCs) 和 SSCs 克隆上检测到有 OPN 蛋白的分布, 发现公猪射出的精子头上有 OPN 蛋白的分布, 精子在体外获能后, OPN 蛋白在精子头中部的含量和分布明显较获能前的减少; 通过用兔抗人 OPN 抗体分别处理精子和卵子后, 发现抗 OPN 抗体能显著降低猪体外受精的能力 ($p < 0.01$)。猪 OPN 基因全长 1430bp, 146bp 到 1009bp 为编码成熟肽段, 编码 288 个氨基酸, 理论分子量为 31.93KDa, pI 为 4.31, 成功构建了猪 OPN 基因的原核表达载体 pET-OPN, 通过 Western Blot 检测, 表达出来的重组目的蛋白具有免疫原性, 可以在进一步研究中作为特异抗原使用。

关键词: 猪; 骨桥蛋白; 精原干细胞; 体外受精

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