

## 3<sup>rd</sup> International Conference on **Integrative Biology**

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### **Integrative understanding and study of animal health using ecoimmunological concepts**

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Whereas classic immunology deals with animal health primarily in the immune system of a laboratory-based animal species, the emerging discipline of ecoimmunology seeks to understand bona fide immune reactions integrating into intra-organismic systems and interacting with ecological and even evolutionary processes. In this context, I first address our ecoimmunological view over the topic of antibiotic resistance/tolerance (ART) to categorize available alternatives to antibiotics and promote the discovery of prospective approaches to relieve ART problems within the general scope of improving animal health. In addition, the advance of omics technology facilitates our studies in this interdisciplinary area. For example, non-bias transcriptomic analyses such as RNA-Seq provide genome-wide gene expression profiles underlying versatile interaction of the immune system with other systems at intra and inter-organismic levels. Here using two data sets of our transcriptomic analyses, I will address the multifaceted interactions centered on immune responses which might be intuitive and highlighted in other related studies in animal health. Therefore, we are equipped conceptually and methodologically for studying multi-system integration centered by animal immune system in animal health which may elicit mechanistic studies and therapeutic strategies pertinent to the discipline of ecoimmunology.

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### **Developmental programming of hypertension: The role of leptin in the central nervous system**

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The obesity in women among child bearing age is increasing and this has been reported to be parallel to the increase in obesity in general population. We determined the trans-generational 'programming' of leptin signalling in the central nervous system (CNS) following an initiation of a high fat diet (HFD) in mothers. Female New Zealand White rabbits were fed a high fat (13%) diet (mHFD) or a normal fat diet (mNFD) prior mating and during pregnancy. Offspring from mNFD rabbits were subdivided and fed a HFD for 10 days (mNFD10dHFD) to mimic adult hood obesity. All rabbits received an Intra Cerebro ventricular (ICV) catheter into the lateral ventricle and a recording electrode on the left renal nerve. Experiments were conducted in conscious rabbits and animals received increasing doses of melanocortin receptor antagonist (SHU9119),  $\alpha$ -Melanocortin stimulating hormone ( $\alpha$ MSH) and a single dose of Leptin antagonist via ICV. BP, HR and RSNA were measured. ICV SHU9119 reduced BP ( $-5.8 \pm 0.7$  mmHg and  $-4.1 \pm 0.9$  mmHg) and RSNA ( $-2.4 \pm 0.3$  nu and  $-0.7 \pm 0.3$  nu) in mHFD and mNFD10dHFD rabbits ( $P < 0.001$ ). Leptin antagonist reduced BP and RSNA only in mHFD rabbits ( $-2.1 \pm 0.5$  mmHg and  $-2.7$  nu, respectively).  $\alpha$ MSH injection increased BP, HR and RSNA in both mHFD and mNFD10dHFD rabbits ( $P < 0.05$ ). Total % fat was increased (50%) in all rabbits that had HFD. Obesity during pregnancy 'programs' leptin signalling pathway in the CNS of the offspring during development. Leptin via activation of melanocortin pathway plays a key role in the CNS contributing to the pressor and tachycardic effects as well as renal sympathetic nerve activity in the pathophysiology of obesity.

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