Hair cortisol concentrations, as a measure of chronic activity within the hypothalamic-pituitary-adrenal axis, is elevated in dogs farmed for meat, relative to pet dogs, in South Korea

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Abstract

Human consumption of dog meat continues in some countries as a result of tradition, ritual and claimed medical benefits. In South Korea, it is estimated that over 2,500,000 dogs (Canis familiaris) are eaten annually; however, dog farming is unregulated, as dogs are not classified as livestock, leading to animal welfare concerns. A key component of the physiological stress response is activation of the hypothalamic-pituitary-adrenal (HPA) axis. Cortisol released as a consequence of HPA axis activation is stably deposited in growing biological media, such as hair. Extraction and quantification of hair cortisol can provide a historical record of physiological stress experienced as the hair was growing. By comparison of hair cortisol concentrations in samples collected from dogs surrendered from meat farms with pet dogs, this study demonstrates that hair cortisol concentrations from dogs rescued from meat farms are over twice as high as pet dogs living in and close to Seoul. This difference was independent of sex, breed and coat colour. Within the farmed dogs there were no significant effects of farm identity, number of dogs per farm or dogs per cage. Within the Korean Jindos surrendered from meat farms, hair cortisol was significantly higher in white-compared to black-coated dogs but there were no significant differences within or between dogs of other coat colour variants (agouti, brown). These data provide quantitative evidence that dogs in meat farms are kept in conditions associated with poor welfare and identify the need for better welfare laws to protect farmed dogs.

Keywords: animal welfare, dog, dog meat farms, hair cortisol, South Korea, stress

Introduction

The farming of dogs (Canis familiaris) for meat production is controversial due to cultural differences and to the role of dogs as companion animals in many cultures. Where dog farming exists, it is often unregulated, with animals maintained in intensive, unsanitary conditions with poor veterinary care throughout and at the end of life (Podberscek 2007, 2009; Kim 2008). In Korea, while dog meat has been eaten for over 2,000 years its popularity has varied with dynastic rule and associated changes in religious belief (Podberscek 2009) and it became accepted as a food source more recently as a result of food shortages associated with the Korean war of 1950–1953 (Podberscek 2009). While there has been international condemnation of the consumption of dog meat in countries such as South Korea, it remains popular (it is estimated that ~2.5 million dogs are slaughtered for food each year [Czajkowski 2014]) as a result of tradition (Kim 2008; Czajkowski 2014), and its purported effects on well-being and vigour (Podberscek 2009). In Korea, 27% of the population, predominantly older males, eat dog meat (Kim 2008; Podberscek 2009). In South Korea, the demand for dog meat is serviced by over 750,000 dog meat farms (Czajkowski 2014), however as dogs are not legally classified as livestock (Livestock Products Sanitary Control Act [Republic of South Korea] 2010), the practice of dog farming is largely unregulated, and the welfare of dogs unprotected (Czajkowski 2014). Reports suggest that the meat farm dogs are typically kept in cramped conditions, at high stocking densities, with inadequate nutrition and veterinary care (Kim 2008; Podberscek 2009). While there is no published evidence that documents the health and welfare of farmed dogs in any Asian country, studies relating to the protection of human health report parasite load and disease incidence in dog meat and carcases (Kim et al 2009) that suggest that dog welfare may be compromised in such establishments (Mack & Fokidis 2017). However, quantitative evidence that dogs in meat farms are physiologically stressed is lacking.

In dogs, as in other animals, the physiological stress response to a demand or threat is mediated by increased activity within the sympatho-adreno-medullary (SAM) and hypothalamic-pituitary-adrenal (HPA) axes (Buhler et al 1978; Herman et al 2016). In dogs, the principle mediator of HPA axis activity is the hormone, cortisol (Beerda et al 1996, 1997). While an acute cortisol response may be beneficial, cortisol is homeostatic, ie its acute actions serve to restore