

## Hormones in the spotlight

### From androgens to endocrine disruptors

Hormones are biochemical messenger substances with essential importance for the regulation and maintenance of vital body functions such as reproduction, metabolism, digestion and growth. The application of hormones as growth promoters for food-producing animals including aquaculture is prohibited in the EU with a strict and limited exceptional use of certain substances for therapeutic uses and livestock breeding. In other countries such as the US, Canada, Brazil, Australia and New Zealand the legal use of hormones in stockfarming is common practice.



## Hormone classes

The most prominent class of hormones are **steroid hormones**. Representatives of these groups are naturally present within the human or animal body in small concentrations depending on gender and age. Also synthetic derivatives and non-steroidal hormones exist (s. Tab.1).

## Food regulation

Council Directive 96/22/EC prohibits the use of substances with hormonal or thyreostatic action and  $\beta$ -agonists in stock farming, resulting in a zero tolerance in food products in the EU. Exceptional use is allowed for special therapeutic uses or livestock breeding, e.g. for the corticosteroids dexamethasone, or clenbuterol. For these substances animal and tissue specific maximum levels are

harmonised within Regulation (EC) No. 37/2010.

## Our analytical offering

Experts from our Competence Centre for Veterinary Drug Residues have long-term experience with the analysis of veterinary drug residues for a large variety of matrices. Our standard portfolio covers about 250 veterinary drugs. We offer a broad range of screening and confirmation methods from single substance to multi-class analysis.

We offer the analysis of hormones using HPLC-MS/MS (s. Tab. 1). More details on our analytical scope of hormones and limits of quantifications can be found in a **Technical Sheet**.

Our standard turn-around-time is 7 days. Rush service within 1, 2, or 3 days is also available on request.

Tab. 1: Overview on hormone classes

	Substance class	Analytical scope (examples)	Characteristics, metabolic effects
Steroid hormones	<b>Androgens</b>	<b>15 androgens</b> , e.g. (epi-) testosterone, boldenone, trenbolone	male sexual hormones, in low doses also present in females, <b>promote bone / muscle growth, anabolic effects</b>
	<b>Estrogens</b>	<b>5 estrogens</b> , e.g. estradiol, estrone	female sexual hormones, in low doses also present in males, regulate menstruation
	<b>Gestagens</b>	<b>10 gestagens</b> , e.g. progesterone, medroxyprogesterone acetate, chlormadinone	female sexual hormones, in low doses also present in males, regulate menstruation / pregnancy, <b>anabolic effects with estrogens / androgens</b>
	<b>Corticosteroids</b>	<b>6 corticosteroids</b> , e.g. dexamethasone, betamethasone*	hormones of the adrenal cortex, regulate metabolism, growth, immune response and inflammatory reactions, <b>anabolic effects and improved water binding in meat</b>
Non-steroidal hormones	<b>Thyreostats</b>	<b>5 thyreostats</b> , e.g. thiouracil, methimazole	thyroidal hormones, regulate energetic metabolism and cell growth, <b>anabolic effects</b>
	<b>Stilbenes</b>	<b>3 stilbenes</b> , e.g. diethylstilbestrol	synthetic hormones, one of the first oral contraceptives, cancerogenic, <b>anabolic effects, endocrine disruptors</b>
	<b>Resorcylic acid lactones</b>	<b>4 resorcylic acid lactones</b> , e.g. zearalanone, zearalenol, zearalanol	produced by fungi from the <i>Fusarium</i> genus, estrogenic and <b>anabolic effects, endocrine disruptors</b>
	<b><math>\beta</math>-Agonists</b>	<b>21 <math>\beta</math>-agonists</b> , e.g. ractopamine, clenbuterol	synthetic hormones, <b>anabolic effects, endocrine disruptors</b>