

BIOLOGICAL RESPONSES OF BROILER CHICKENS TREATED WITH
EPIDERMAL GROWTH FACTOR

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Epidermal Growth Factor (EGF) is a polypeptide with biological activity in many cell types (Carpenter and Cohen 1979). In mammals there is evidence that EGF may have an important role in neonatal development. Recently, Mesiano (1982) detected an EGF-like material in chickens, which had a high degree of homology with mouse EGF (mEGF). There is no information on biological actions of EGF in avian species. Here we report the effects of administering mEGF subcutaneously to newly hatched male broiler chickens over a one week period. Birds were randomized as day-olds into fifteen experimental groups (n=12). Three groups were allocated to each treatment, which were control, 0.1, 0.25 and 0.50 ug mEGF/g live weight/d. Live weight (W) of individual birds and food intake of groups were recorded. After eight days of treatment, blood samples were taken at 3, 6, 12 and 24 hours after injection, and the birds were slaughtered and intestines, pancreas and liver were removed for analysis. Because the pancreas and liver are not a constant proportion of W in chickens (Dror et al. 1977) these were compared to a regression of pancreas and liver weights against (W) obtained from an untreated group of chickens. Results are given in the Table.

Table. The biological effects of mEGF treatment in male broiler chickens.

Treatment ugEGF/gW	Live weight (g)	Food intake (g)	Liver weight (g)	Pancreas weight (g)	Jejunal lipase ⁺⁺	Plasma corticosterone (Ng/ml) ⁺
0.0	110.3a*	98.7a	5.3a	0.68a	18.7a	5.4a
0.1	101.7b	85.8ab	5.0a	0.59a	14.9a	30.7*
0.25	89.0c	70.5c	3.8b	0.41b	13.4a	42.4c
0.50	72.2d	52.9d	2.8b	0.25b	6.2b	81.5d

⁺ 3 hours post injection; ⁺⁺ μ moles free fatty acid/g wet tissue/min;

* means not containing the same letter differ significantly (P<0.05).

Treatment with mEGF reduced W, food intake, pancreas and liver weight and depressed intestinal lipase activity. The reduced W was mainly due to a reduction in food intake. Plasma corticosterone levels were increased in a dose-dependent manner with mEGF treatment. In a subsequent experiment, it was found that corticosterone (1ug/gW/d) injections to day-old broilers over a 7d period evoked responses in W and food intake similar to mEGF administration. The biological responses to EGF therefore appear to be attributed to the increased plasma corticosterone. Further experiments and analysis of blood samples in a mammalian ACTH radioimmunoassay indicated that EGF in broilers acted at the hypothalamic-pituitary level to stimulate ACTH release. We propose that the biological effects of mEGF reported here are brought about by EGF action at the hypothalamic-pituitary level.

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