LH levels or on the concentration of FSH in the pituitary (table 2). Pituitary LH levels were reduced by grafts ($p < 0.025$) but not by PRL. This latter discrepancy between the results obtained with pituitary transplants and with injected PRL could be due to different patterns of peripheral PRL levels after these treatments (sustained vs intermittent elevations) or to species specificity of PRL (murine vs ovine hormone).

Increase in plasma FSH levels in castrated dwarf mice treated with PRL-producing pituitary grafts indicates that the previously demonstrated ability of PRL to stimulate testicular growth and function in these animals[4,5] does not account for its effect on FSH release. Sexual dimorphism in the response of FSH release to PRL is evident from comparison of results obtained in males[5] and in females given identical treatments in the present study. This dimorphism probably cannot be explained by higher androgen levels in male animals, because castration did not abolish the ability of PRL to stimulate FSH release in male dwarfs, or by the effects of ovarian steroids since *dw/dw* females do not undergo sexual maturation and have atrophic uteri and no corpora lutea in the ovaries[4,8]. Perinatal masculinization of the CNS by testicular androgens is believed responsible for sexual dimorphism in numerous neuro-endocrine characteristics and therefore it may account also for the difference between males and females in the response of FSH regulatory mechanisms to PRL.

Significant increase in pituitary FSH levels in intact engrafted male dwarfs[5] and a similar, although not significant, trend observed in castrated males in the present study (table 1) suggest that PRL was exceedingly unlikely to modify plasma FSH levels by reducing its clearance. The mechanism by which PRL may stimulate FSH synthesis and release in male dwarf mice is unknown. However, we suspect that dopaminergic neurons may mediate this action of PRL, because PRL can increase dopamine turnover in the hypothalamus[9] and pharmacological blockade of dopaminergic receptors appears to prevent increase in FSH levels in pituitary-engrafted hamsters (Bartke and Ojeda, unpublished).

Results obtained in golden hamsters[10,11] suggest that the ability of PRL to stimulate the release of FSH but not LH in male mammals is not limited to laboratory mice or to animals with PRL deficiency. In addition to suggesting a role for PRL in regulating FSH release, the present findings indicate that stimulation of testicular function by PRL[5,12] may involve both direct effects of PRL on the Leydig cells[12,13] and consequences of PRL-induced increase in plasma FSH levels.

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The role of calcitonin in hypocalcemia in acute experimental pancreatitis

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Summary. Experimental pancreatitis in rats was accompanied by hypocalcemia. Thyroidectomy did not abolish the fall in serum calcium observed in intact animals during pancreatitis. Data presented in our study suggest that the thyroid gland and calcitonin are not important factors in causing the hypocalcemia observed in rats.

A number of theories have been advanced to explain the hypocalcemia which is frequently observed in acute pancreatitis[1-3]. Edmondson proposed that the hypocalcemia might be due to calcium deposition in and around the necrotic pancreatic tissue[3,4]. This is not a likely explanation for the prolonged hypocalcemia observed since induced hypocalcemia is normally followed by an increase in parathormone concentration and in a return of serum calcium to normal levels within 12 h[5,6]. A hormonal basis has been postulated for the hypocalcemia commonly seen in pancreatitis. It has been suggested that the hypocalcemia of acute pancreatitis may be an effect of glucagon which is increased in pancreatitis[7,8]. Other possible causes of hypocalcemia include increased secretion of calcitonin, which has a hypocalcemic effect[9-11]. The present studies were undertaken to test whether acute pancreatitis can stimulate calcitonin secretion which may then be involved in the pathogenesis of the hypocalcemia that complicates acute pancreatitis.

Materials and methods. 45 male rats (Wistar, 300-400 g) were kept on a standard diet and divided into several groups: controls, controls with pancreatitis, parathyroidectomized, parathyroidectomized with pancreatitis, thyroparathyroidectomized, and thyroparathyroidectomized with pancreatitis. Acute experimental pancreatitis was produced as follows: under mild ether narcosis, 0.6 ml of 5% sodium cholate (lot 0369071/73 Spofa, Prague) was administered interstitially into the pancreas[12]. Rats were thyro-

Group	Number of rats	Amylase (units/l)	Serum calcium (mmoles/l)	Serum phosphorus (mmoles/l)	Calcitonin MRC units/g th.gl.
1 Intact	8	6,360 ± 545 (2, 4, 6)	2.51 ± 0.03 (2, 3, 4, 5, 6)	2.4 ± 0.08 (3, 4, 5, 6)	21.97 ± 1.80
2 Intact + AP	8	20,948 ± 610 (1, 3, 5)	2.27 ± 0.04 (1, 4, 6)	2.4 ± 0.06 (3, 4, 5, 6)	19.72 ± 1.29
3 PTX	7	6,194 ± 284 (2, 4, 6)	2.34 ± 0.03 (1, 4, 6)	2.6 ± 0.09 (1, 2)	
4 PTX + AP	7	20,372 ± 1,055 (1, 3, 5)	1.95 ± 0.05 (1, 2, 3, 5)	2.6 ± 0.07 (1, 2)	
5 TXPTX	7	6,340 ± 276 (2, 4, 6)	2.33 ± 0.03 (1, 4, 6)	2.6 ± 0.08 (1, 2)	
6 TXPTX + AP	8	20,670 ± 780 (1, 3, 5)	1.95 ± 0.04 (1, 2, 3, 5)	2.6 ± 0.11 (1, 2)	

PTX, parathyroidectomized rats; TXPTX, thyroparathyroidectomized rats; AP, acute pancreatitis. Values are means ± SE. The numbers of groups with statistically different means are given in brackets.

parathyroidectomized and parathyroidectomized 7 days before the experiment. After 6 h of treatment with sodium cholate the animals were killed. Blood samples were analyzed for calcium[13], phosphate[14], amylase[15], and blood urea nitrogen. The calcitonin content of the thyroid glands was estimated by bioassay[16]. The statistical significance of the data was evaluated by Student's t-test.

Results. The diagnosis of acute pancreatitis was based on serum amylase levels and macroscopic changes in the pancreas and in the abdominal cavity. A progressive increase in serum amylase occurred in all animals with acute pancreatitis as compared with animals without pancreatitis (table). In intact rats with acute pancreatitis there was a significant decrease in serum calcium in comparison with the control group. A much more pronounced fall in serum calcium was found in thyroparathyroidectomized rats with acute pancreatitis as compared with the thyroparathyroidectomized rats without pancreatitis. There was no significant difference in the magnitude of the fall in serum calcium between the thyroparathyroidectomized and parathyroidectomized animals with acute pancreatitis. A significant increase in phosphatemia after parathyroidectomy was observed; this is in agreement with previous observations in the literature. No statistically significant changes in serum phosphate were detectable in any of the 3 groups of rats with acute pancreatitis. We did not observe a statistically significant decrease in the calcitonin content of the thyroid glands of animals with acute pancreatitis. All the results are summarized in the table.

Discussion. Elevated calcitonin levels have been observed in patients with acute pancreatitis[17-19]. The observations of Canale suggest that there is a close relationship between serum calcitonin level and hypocalcemia during pancreatitis in humans[1]. On the other hand, no calcitonin was detectable by radiomimmunoassay in the plasma of patients with marked hypocalcemia associated with pancreatitis[2]. Calcitonin probably does not play a key role in the hypocalcemic effect of acute pancreatitis in patients[20]. The hypocalcemic effects of calcitonin in man are relatively weak and easily compensated for by other calcium homeostatic mechanisms[21]. Increased serum glucagon from the inflamed pancreas may be an important factor in causing the hypocalcemia characteristic of acute pancreatitis[8,20]. Elevated levels of serum glucagon may result in a sustained stimulus to the C cells[8,9,20]. The results of the experiment of Avioli et al.[9] indicated that glucagon induced the release of calcitonin from the thyroid gland of dogs and that the hypocalcemic effect was abolished by thyroidectomy or thyroparathyroidectomy. In our experiment, thyroidectomy did not abolish the fall in serum calcium observed in intact animals during acute pancreatitis. Data presented here suggest that the thyroid gland and the secretion of calcitonin are not important factors in causing the hypocalcemia observed in rats.

The specific mechanism of hypocalcemia in acute pancreatitis remains unknown, but it is likely that in pancreatitis there is a complex interaction among the calcitropic hormones and this influences blood calcium concentration.

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