Table 1 Effect of steroid hormones on tissue levels of PGDH in the rat

Tissue source	*Treatment*	*PGE_2 oxidized*	
		fmol mg^{-1} min^{-1} (mean ± s.e. mean)	
Kidney	Control (♂)	594.4 ± 9.5	(*n* = 5)
	Adrenalectomized	835.5 ± 5.5	(*n* = 3)
	Control + hydrocortisone	525.0 ± 3.1	(*n* = 3)
	Adrenalectomized + hydrocortisone	486.7 ± 4.1	(*n* = 3)
	Control + dexamethasone	348.1 ± 6.6	(*n* = 5)
	Control (♀)	609.6 ± 82.2	(*n* = 3)
	Ovariectomized	704.4 ± 25.6	(*n* = 5)
	Ovariectomized + progesterone	583.4 ± 19.0	(*n* = 5)
	Ovariectomized + oestradiol 17β	103.2 ± 5.4	(*n* = 5)
Lung	Control (♀-ovariectomized)	914.4 ± 121.57	(*n* = 3)
	Pregnant (18 day)	1699.6 ± 58.8	(*n* = 3)
	Pregnant (Parturition)	24.8 ± 6.6	(*n* = 3)

depression of PGDH levels occurring during parturition—which could perhaps be due to the oestrogen surge occurring about this time—could be a controlling factor in determining the rise in prostaglandin activity during parturition.

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Formation of prostaglandin endoperoxides and rabbit aorta contracting substance (RCS) by coupling two enzyme systems

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Piper & Vane (1969) detected the release of an additional and labile substance during anaphylaxis in isolated lungs from sensitized guinea-pigs. Because of its activity, they called it 'rabbit aorta contracting substance' or RCS. The half life of RCS was less than 2 minutes. Thromboxane A_2 (TxA2) has a half life of 30 s, induces platelet aggregation and contracts rabbit aorta; it is thought to be RCS (Samuelsson, 1975). TxA_2 is generated from prostaglandin (PG) G_2 or PGH_2 by tissues such as lungs or platelets (Samuelsson, 1975).

We have used washed platelets obtained from fresh citrated horse blood to show that conversion

of PGG_2 to TxA_2 is enzymic. The platelets were disrupted by freezing and thawing three times. The lysate was centrifuged at 5000 *g* for 50 min and the supernatant recentrifuged at 100,000 *g* for 60 minutes. The resultant microsomal pellet was washed and re-suspended in 2 ml of 100 mM Tris (pH 7.5) buffer.

The biological activity of the products was assayed on a rat stomach strip and rabbit aorta superfused at 10 ml per min with Krebs' solution at 37°C containing a mixture of antagonists (Gilmore, Vane & Wyllie, 1968) plus indomethacin (1 μg/ml) to make the assay more specific.

PGG_2 or PGH_2 contracted rabbit aorta and rat stomach strip in a concentration dependent manner. When PGG_2 or PGH_2 was incubated at 0°C with horse platelet microsomes and immediately tested, the contraction of the rabbit aorta was greatly augmented; the contraction of the rat stomach strip was substantially reduced, or disappeared altogether.

When PGG_2 was incubated with intact platelets, a powerful rabbit aorta contracting substance was also produced. Neither boiled platelet microsomes nor the 100,000 *g* supernatant fraction from lysed platelets converted PGG_2 or PGH_2 into a more potent compound.

PGG_2 has a half life in aqueous solution of about 5 min (Hamberg & Samuelsson, 1973); after standing at room temperature in an aqueous solution for 25 min, the intrinsic contractor activity on rabbit aorta disappeared, as well as the ability to generate RCS after incubation with platelet microsomes.

When arachidonate was incubated (without cofactors) with the microsomal preparation of ram seminal vesicles prepared according to Takeguchi, Kotina & Sih (1971), a product was formed which behaved like PGG_2 or H_2. It contracted rat stomach strip and rabbit aorta and had a half life of 3-5 minutes. It was converted to a more potent RCS-like substance ($t_{1/2}$ = 30 s) by incubation with platelet microsomes. Thus, we consider seminal vesicle microsomes plus arachidonate as an endoperoxide generating system (i.e. cyclo-oxygenase) and platelet microsomes plus PGG_2 as an RCS (TxA_2) generating system (thromboxane synthetase).

The use of these two enzyme systems, either alone or in combination, offers a relatively simple source of endoperoxides and TxA_2 which are extremely unstable materials otherwise difficult to obtain. The transformation of endoperoxides to TxA_2 could be of importance in physiological or pathophysiological conditions.

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Chemotactic activity of solutions of prostaglandin E_1

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Prostaglandin E_1 but not other prostaglandins (A_1, E_2, $F_{2\alpha}$) has been reported to possess chemotactic activity against rabbit polymorphonuclear leucocytes *in vitro*. The earlier observations were obtained using a concentration of 1 μg/ml (Kaley & Weiner, 1971; McCall & Youlten, 1973) but more recently it has been claimed that the prostaglandin is chemotactic at concentrations down to 10 ng/ml (Higgs, McCall & Youlten, 1975). This finding is of much more relevance to inflammation *in vivo* since it occurred at concentrations below those of the total prostaglandins found in the carrageenin-induced air bleb in the rat (McCall & Youlten, 1974).

Other workers (Turner, Campbell & Lynn, 1975) have failed to detect any chemotactic activity of various prostaglandins, including E_1, towards human polymorphonuclear leucocytes *in vitro* even at concentrations as high as 100 μg/ml. Furthermore the local injection of prostaglandin E_1 into areas of human and rat skin does not cause