Comparative studies on the activity of oxalyl-CoA synthetase in pulses (μmoles of acetyl phosphate/mg protein)

Crops	Age (days)	Chickling pea (Lathyrus sativus L.)		Pea (Pisum sativum Linn. sens ampl.)		Lentil (Lens esculenta Moench)		Chick pea (Cicer arietinum Linn.)	
		P-213 (early)	P-257 (late)	Green frost (early)	T-6115 (late)	Pusa-1 (early)	Pusa-6 (late)	BG 109-1 (early)	P-600 (late)
Winter pulses (post monsoon)	1	0.0143	0.0240	0.0274	0.0180	0.0240	0.0235	0.0121	0.0132
	3	0.0234	0.0305	0.0291	0.0369	0.0280	0.0350	0.0182	0.0275
	5	0.0267	0.0347	0.0294	0.0415	0.0421	0.0628	0.0570	0.0200
	10	0.0462	0.0576	0.0307	0.0830	0.0921	0.1009	Trace	0.0158
Crops	Age (days)	Pigean pea (Cajanus cajan [L.] Millsp)		Soybean (Glycine max [L.] Merr.)		Green gram (Phaseolus aureus Roxb.)		Cowpea (Vigna sinensis [L.] Savi exttassk.)	
		Pusa Ageti (early)	NP(WR)-15 (late)	Clark (early)	L.P. (late)	PS-16 (early)	L-242 (late)	Pusa phalguni (early)	NP_3 (late)
Summer pulses (pre monsoon)	1	0.02160	0.01370	0.02340	0.02080	0.02220	0.03390	0.0168	0.0195
	3	0.09297	0.06647	0.03798	0.02101	0.02035	0.02471	0.0652	0.0303
	5	0.06263	0.08035	0.03400	0.03778	0.10350	0.08730	0.1083	0.1403
	10	0.07750	0.08074	0.09570	0.04790	0.13280	0.21050	0.1665	0.1337

genetic variabilities, the activity of the enzyme was found to increase with the aging of the seedlings, which was quite noticeable after 5 days. In the case of winter pulses, excepting in chick pea, the change in oxalyl-CoA synthetise activity proceeded in stages, whereas in summer pulses such a trend was not observed. Again excepting in chick pea, the enzyme remained more active in late strains than in early strains of winter pulses, while in summer pulses it behaved differently. This discrepancy in the enzyme activity is supposed to be a) the inherent characteristics of the pulses and b) the climatological effect on the growth of pulses. On the basis of activity of oxalyl-CoA synthetase, it is surmised that pea, chickling pea and lentil may be placed in one group, while the second group consists of summer (pigean pea, soybean, green gram and cowpea) pulses, and the third group of only chick pea.

Effect of electric shock on serotonin (5 HT) content in different organs of rat

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Summary. 5 HT content of heart, brain, kidneys and liver in rats increases significantly after repeated exposure to electric shock followed by a trend of normalisation. These changes appear to be organ specific.

Stress is known to induce a number of neurohumoral, hormonal and metabolic alterations in the living organism. It is well-known that stress modifies both noradrenergic and serotonergic activities in the central nervous system [1-4]. During stress, the sympathetic adrenomedullary system is activated. Several studies have demonstrated enhanced synthesis of catecholaminies during the stressful situations. However, little attention has been paid to 5-HT metabolism in peripheral organs in the above condition. The few published studies indicate, however that changes in the 5-HT level in blood and in different organs may occur in animals submitted to stress[5-9]. Lauria[10] observed raised concentration of 5-HT in the heart following electric shock. Other peripheral tissues have not been studied much. Thus the 5-HT content in heart following electric shock suggests that in peripheral organs 5-HT may be involved in alarm reaction similar to catecholamines.

In the present study, we have investigated the influence of electric shock on 5-HT content in 4 vital organs namely the heart, the brain, the kidneys and the liver of rats. Such a study may be helpful for a better understanding and suitable medulation of 5-HT metabolism in peripheral sites during stressful situation.

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Showing the level of 5 HT in different organs following electric shock (μg/g of tissue)

Tissues	Control ± SD	1st week ± SD	2nd week ± SD	3rd week ± SD	4th week ± SD
Heart	0.721 ± 0.197	1.644 ± 0.097***	3.345 ± 0.344***	2.210 ± 0.102***	1.863 ± 0.061***
Whole brain	0.591 ± 0.148	2.443 ± 0.103***	1.171 ± 0.026***	1.571 ± 0.066***	0.975 ± 0.045
Kidney	2.317 ± 0.865	1.227 ± 0.188*	2.760 ± 0.187	3.020 ± 0.120	2.334 ± 0.026
Liver	1.953 ± 0.607	1.900 ± 0.290	1.990 ± 0.130	2.819 ± 0.148**	1.470 ± 0.367

*$p < 0.025$, significant, **$p < 0.01$, significant, ***$p < 0.001$, significant (compared to control).

Material and methods. 30 healthy male albino rats weighing between 100 and 125 g were selected, out of which 6 were kept under normal laboratory conditions to serve as a control group. The other 24 rats were subjected to electric shock through their feet[11] (an intermitant current of 60 volts daily for 30 min for 4 weeks). The animals were sacrificed in different weeks (6 in each week) and the tissues were collected in ice-cold perchloric acid (0.4 N PCA) for 5-HT estimation following the method of Snyder et al.[12] within 48 h of sacrifice. The data were analyzed with the Student t-test.

Results. The normal tissue levels of 5-HT have been shown in the table. After electric shock, the level of 5-HT in brain and heart significantly increases in different weeks, but the highest level was observed in the 1st week in brain and in the 2nd week in the heart. In 4th week the level remains still significantly high. The levels of 5-HT in kidneys and liver were found highest after 3rd week. The kidneys show a significant fall after 1st week, followed by a significant increase after 2nd and 3rd week. At the end of 4th week, the level becomes normal. There was no significant change in case of liver after 1st and 2nd weeks. At the end of 4th week the level comes down below the normal level (statistically insignificant) (table).

Discussion. In response to electric shock, the rats showed significantly elevated levels of 5-HT in different tissues. The variations of the 5-HT content in different tissues of the normal subjects may be due to the number of enterochromaffin cells and the serotonergic fibres present in a particular tissue. It may also be due to the tolerance of 5-HT by the tissue, because 5-HT is a vasoconstrictor substance, the presence of which in a higher or lower concentration may be responsible for the maintenance of the normal microcirculation. Thus, following stress, the degree of change in the level of 5-HT content in different tissues is not uniform. Hence the physiological responsiveness of the particular tissue to a particular stimulus appears to be responsible for such variations.

In case of liver, heart, kidneys and brain tissues, it is obvious that the animals may adapt the normal physiology after repeated stress. The disturbances and the mechanism by which the level of 5-HT increases following stress, has been demonstrated by many workers[13–15]. The study of disturbances caused by stress may be helpful in understanding the pathophysiology of various stress disorders.

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Nuclease for DNA apurinic sites in chicken liver

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Summary. Chicken liver crude extract produced acid-soluble diphenylamine-positive material in the presence of depurinated and alkylated DNA, while the formation of such material from normal and single stranded DNA was comparatively low. The maximum acid-soluble material produced was not increased further by alkali, indicating that the enzymatic action is mostly directed towards apurinic sites.

Depurination of DNA and its repair has been the subject of some interest in the recent past[2–6]. It has been suggested that the cellular DNA may be spontaneously undergoing some depurination under physiological conditions[3]. Endonucleases specific for apurinic sites that may have a role in the repair of such sites, have been shown to exist in bacteria and mammalian cells[2,4–6]. In this communication we report the presence of a nuclease (s) that degrades alkylated and depurinated DNA in chicken liver.

Materials and methods. The method for preparation of depurinated DNA was essentially that of Hadi and Goldthwait[2] with some modifications[7], and it involved heating the DNA at pH 3.5. The preparation of alkylated DNA and depurinated DNA from alkylated DNA has been described[7,8]. Chicken liver crude extract was prepared by homogenizing freshly excised liver with 3 volumes of cold tris-HCl buffer (0.05 M, pH 7.0). The homogenate was centrifuged at 1000 × g for 5 min and the supernatant obtained used as the source of enzyme. Nuclei were isolated and purified by a standard procedure[9]. The procedure for extraction of enzyme from nuclei was essentially as described by Ohtsuka et al.[10].

Results and discussion. Figure 1 shows the effect of chicken liver crude extract on native and depurinated DNA. With each substrate, the perchloric acid soluble