Histological and histochemical study on the neuroendocrine cells of the gastrointestinal tract after treatment with l-dopa in rabbit

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Forty adult male rabbits (avoiding any secondry effect on the female sex hormones and the reverse) were utilized in this study. Some animalswere given 35 mg/kg body weight/day of L-Dopa orally for 2,4 and 6months to study the effect of chronic treatment with L-Dopa. Otheranimals were given distilled water and served as controls.Paraffin sections were prepared and stained with haematoxylin andEosin. The mucosa of the gastrointestinal tract was studied histologically.Other sections were stained with periodic acid- Schiff to reveal thecarbohydrates, and glycoproteins of the mucus secreting cells and gobletcells in the different segments of the gastrointestinal tract. Pascual's stain,Singh modification of Mosson - Hamper! stain, alkaline diazo stain ofGomori and PAS-lead - Hx methods were performed to reveal the effect ofL-Dopa on the neuroendocrine cells of the gastrointestinal tract. Lastly,Schofield method for demonstration of Meissner's and Auerbach's plexuseswas performed to study the effect of L-Dopa on these subjects.The results revealed an increased folding, enlargement and packingof the gastric glands, villi and crypts of Lieber kuhn with gradual apparentmcrease m number of their epithelium. Vascular dilatation andengorgement of blood vessels between the gastric glands, crypts ofintestine, appendix and the rectum were observed. This was due to thetrophic effect of L-Dopa and its metabolites and the gastrointestinalirritation caused by the central stimulation of the chemoreceptor triggerzone exerted by the drug. Vascular dilatation and engorgement wasexerted by the direct action of the drug on the mesentric blood vessels.The mucus secreting cells of the stomach and goblet cells all overthe intestines, appendix and rectum showed gradual enlargement andapparent increase in number. This denotes that carbohydrate, glycoproteinsof the tissue increased through glycogenesis and proteogenesis exerted byadministration ofL- Dopa.As revealed with different stains; the enteroendocrine cellsprogressively enlarged in size & apparently increased in umber and theirintensity of cytoplasmic granules. Groups of cells more than 2 were morefrequent (2-4) after oral administration of L-Dopa. This explains the abilityof the enteroendocrine cells to uptake and decarboxylate the amineprecursors into amines and their storage. The noticed gradual hypertrophyand apparent increase in number of the enteroendocrine cells all over thegastrointestinal tract, was exerted by the trophic effect of theneuroendocrine cell products.There was also hypertrophy of the nervous elements in theMeissner's and Auerbach's plexuses explaining the

trophic action of thedrug and its metabolites on these dopaminergic and adrenergic (inhibitory)elements and may reflect the causes of the decreased gastrointestinalmotility in patients receiving this drug.