

## Diabetogenic and Toxic Effect of Alloxan and Streptozotocin in Normal and in Partially Hepatectomized Rats: A Comparative Study

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### AIM

To examine and compare: i) The diabetogenic potential of Alloxan (ALN) and Streptozotocin (STZ) in inducing experimental diabetes. ii) The biochemical alterations of liver and renal function as well as of lipid metabolism induced after partial hepatectomy in rats.

### METHODS

*1<sup>st</sup> experiment:* Two groups of male Wistar rats were examined. In the first group (Group A) 120 mg/kg b.w. of ALN were administered i.m. Forty-eight hours later the animals were sacrificed at different time points at 0, 12, 24 and 36h. In the 2<sup>nd</sup> group (Group B), STZ was administered at a dose of 45 mg/kg b.w. i.p. One hundred and twenty hours later the animals were sacrificed at the same time points as the previous ones. 48h and 120h being point 0 in each case. The following serum biochemical parameters were measured: glucose (GL), cholesterol (CH), triglycerides (TR), transaminases (ALT and AST), alkaline phosphatase (ALP), total protein (TP), albumin (ALB), urea (U) and creatinin (CR).

*2<sup>nd</sup> experiment:* In two other groups 120 mg/kg b.w. i.m. of ALN (Group C) and 45 mg/kg b.w. i.p. of STZ (Group D) were administered. Forty-eight hours and 120h later respectively the animals were partially hepatectomized (according to Hig-

gins and Anderson method) and sacrificed at different time points at 0, 4, 12, 16, 20, 24, 36, 48 and 60h after hepatectomy. The aforementioned biochemical parameters were also measured.

### RESULTS

*1<sup>st</sup> experiment:* ALN increased GL to much higher levels than STZ did. Moreover, STZ resulted in very low levels of CH and TR, oppositely to that of ALN. Transaminases were lower in ALN- than in STZ-induced diabetes. Especially ALT appeared to be more than ten times higher in the STZ group. Similarly, the rest of biochemical parameters showed much higher levels in the ALN group.

*2<sup>nd</sup> experiment:* In group C, after partial hepatectomy (PH) and during liver regeneration, GL began to decrease but 60h after PH, GL levels showed a small increase again. CH and TR showed the same results. Both transaminases and ALP increased significantly at 20h in both animal groups with a few differences. Urea appeared to be at a very high level during the whole regenerative process.

### CONCLUSIONS

1) STZ, under the used conditions, did not induce experimental diabetes (serum GL > 200 mg%) but only a hyperglucaemic status (110 < GL < 200

mg%). STZ, was associated with severe hepatotoxicity in normal rats, U levels appeared to be too high, whereas CH, TR, CR, TP and ALB remained almost at normal values after STZ administration. On the contrary, GL increased significantly after ALN administration inducing experimental diabetes mellitus. It seemed that ALN had a milder hepatotoxic impact even though it induced renal toxicity and increased the TR levels dramatically but those of CH to a smaller extent.

2) In hepatectomized rats, the diabetogenic effect of ALN diminished progressively according to the

GL levels whereas STZ induced a mild hyperglucaemic status. Based on the AST, ALT levels, the hepatotoxic effect was found to peak at 20h after operation in both animal groups but ALP levels appeared to be differentiated during the regenerative process and no final conclusions can be extracted. Renal toxicity, according to U and CR levels showed a decrease the first hours after PH, a peak at 24h and later on a decrease again. On the contrary, STZ showed a standard high U level whereas the CR levels were almost normal.