chopped grass had *p*H values of 4·03, 4·00 and 4·13, while another sample of the same crop ensiled at the same time in an unchopped condition had a final *p*H of 4·46. The carbohydrates liberated by the chopping can replace molasses, and it is conceivable that, with the accompanying liberation of plant amino-acids, a further stimulus is given to the growth of lactobacilli—a possibility suggested by the findings of Dolby and Waters[2] and Harry[3] in connexion with studies on *Lactobacillus caseii*. Further, the findings of Brouwer[4], on the inter-relationship of dry matter content and *p*H in silage, mentioned by de Man, have been confirmed by Brown[5] and extended by myself[6] to include the nitrogen content as well.

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## β-Glucuronidase Activity of Peripheral Nerve during Wallerian Degeneration

When a peripheral nerve is cut, the portion of the nerve distal to the point of section undergoes a series of changes characteristic of Wallerian degeneration. The axon and, later, the myelin sheath are destroyed and there is an increase in the number of both Schwann cells and endoneurial cells (chiefly fibrocytes and macrophages) found along the course of the nerve[1,2]. We have now shown that in such a degenerating peripheral nerve there is a marked increase in the activity of the enzyme β-glucuronidase.

The β-glucuronidase activity of the sciatic nerve of the cat increased by a factor of 30–40 sixteen days after nerve section (see table). The enzyme activity of whole homogenates of nerve was determined in acetate buffer *p*H 4·5 by the method of Fishman, Springer and Brunetti[3], using biosynthetic phenolphthalein mono-β-glucuronide as substrate.

In addition to the increase in β-glucuronidase activity, there was also an increase in the concentration of both deoxypentosenucleic acid and pentosenucleic acid. Since considerable difficulty was experienced in applying the usual methods for the quantitative determination of nucleic acids to tissue from the nervous system, resort was made to an ultra-violet absorption method[4]. The increase in the concentration of deoxypentosenucleic acid (by a factor of 3) and of pentosenucleic acid (by a factor of 4–5) is a reflexion of the well-known increase in the cellularity of the nerve. If, as has been suggested, the mean amount of deoxypentosenucleic acid per diploid cell is constant for any given species, the concentration of deoxypentosenucleic acid gives an estimate of the total number of cells in the nerve. Although cell nuclei contain small quantities of pentosenucleic acid, most of the pentosenucleic acid is in the cytoplasm. The concentration of pentosenucleic acid thus gives an indication of the total cytoplasmic mass of all the cells in the nerve, and the ratio of the concentration of pentose- to deoxypentose-nucleic acid gives an indication of the mean quantity of cytoplasm per cell. In the degenerating nerve the concentration of pentosenucleic acid increased more than the concentration of deoxypentosenucleic acid. There was thus a significant increase in the ratio of pentose- to deoxypentose-nucleic acid, suggesting an increase in the mass of cytoplasm per cell, an increase that has been observed microscopically for Schwann cells[1].

β-Glucuronidase Activity and Nucleic Acids of Cat Sciatic Nerve

(Figures in brackets represent the number of animals in each group). Mean ± Standard Error of Mean

| | Normal | Degenerating 16 days | Percentage increase |
|---|---|---|---|
| β-Glucuronidase (Fishman units (see ref. 3) per 100 mgm.) | 34·8 ± 1·3 (56) | 1,280 ± 160 (6) | 3,580 |
| Deoxypentosenucleic acid (mgm. P per 100 gm.) | 4·8 ± 0·1 (52) | 14·4 ± 0·9 (6) | 200 |
| Pentosenucleic acid (mgm. P per 100 gm.) | 3·9 ± 0·1 (52) | 18·5 ± 0·8 (6) | 370 |
| Ratio of pentose- to deoxypentose-nucleic acid | 0·81 | 1·29 | 59 |
| β-Glucuronidase (Fishman units (see ref. 3) per μgm. deoxypentosenucleic acid P) | 7·3 | 88·9 | 1,120 |

The great increase in β-glucuronidase activity is of interest, since Levvy, Kerr and Campbell[5] have suggested a possible relation between β-glucuronidase activity and cellular proliferation. The last line of the table indicates that in the degenerating nerve the mean β-glucuronidase activity per μgm. deoxypentosenucleic acid phosphorus, that is, the mean activity per cell, was some twelve times greater than that of the control nerve. However, in other experiments the mean β-glucuronidase activity per unit deoxypentosenucleic acid was very much less four days after nerve section, a time when cellular proliferation is at its height. Also, the β-glucuronidase activity per unit deoxypentosenucleic acid was still at the high 16-day level thirty-two days after nerve section. At this time the cellularity of the nerve, as judged by deoxypentosenucleic acid determinations, was decreasing. This would suggest, as found by Mills, Smith, Stary and Leslie[6] for rat liver regenerating after subtotal hepatectomy, that the peak in the β-glucuronidase activity per unit deoxypentosenucleic acid occurs after the phase of rapid cellular proliferation.

Similar changes were observed in the concentration of nucleic acids and β-glucuronidase activity when the nerve was crushed rather than sectioned.

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