6. Summary

Gross-anatomical and microscopic-anatomical studies on kidneys and suprarenal glands from pigs of the strains Mini-LEWE and Deutsches Edelschwein after the effects of surgical stress situations under consideration of blood pressure and heart rate

A total of 8 Deutsche Edelschweine and 21 Mini-LEWE were given an extensive quantitative-morphological study of their kidneys and adrenal glands. The Deutsche Edelschweine weighed 13-30 kg (25-90 days) and the Mini-LEWE 15-40 kg (125-290 days) and 41-65 kg (270-460 days), respectively.

After surgical operations on the pigs during which their blood-pressure and heart rate were monitored, they were tested to see if there existed a correlation between the physiological sizes and morphological parameters concerning the kidneys and adrenal glands. Besides the recording of the density of glomeruli morphological studies were carried out on 100 renal corpuscles per kidney. The significantly heavier and older Mini-LEWE show compared to the significantly lighter and younger Mini-LEWE and the Deutsche Edelschweine a significantly higher kidney weight but a significantly smaller relative kidney weight. A moderately positive correlation was found between the body and the kidney weight with regards to the Deutsche Edelschweine. With significance differs the higher relative kidney weight of the Deutsche Edelschweine from the ones of the Mini-LEWE.

There is a definite difference found between the three groups of pigs in the area of the glomeruli as well as in the juxtamedullary and subcapsulary zone.

The older Mini-LEWE show the highest area values over the younger Mini-LEWE and the Deutsche Edelschweine. These significant size differences occur in the areas of glomeruli, in the Bowmans capsule as well as in the Bowmans space (the one exception being the size of the subcapsulary zone in group 2 and 3).

This proves that the area size depends not only on the age of the animals but also the breed as well.

The positive correlations between the standard deviations and the mean areas of glomeruli and Bowmans capsule are due to the different effects of the intraoperative stress factors.

With age the density of the renal corpuscles thin out (group 2: 3 /mm^2, group 3: 2,3 /mm^2). The Deutsche Edelschweine show a significantly higher density of renal corpuscles when the breeds are compared to each other (group 1: 4,1 /mm^2).

When the density of the renal corpuscles is compared in relationship to their area the younger Mini-LEWE show a moderately negative correlation. By the evaluation of the adrenal glands the older Mini-LEWE show a significant spread of the zona glomerulosa in comparison to the younger Mini-LEWE and Deutsche Edelschweine.

Expressed as a percentage the proportional area of the zona glomerulosa concerning the whole area of the adrenal gland is significantly higher for the older Mini-LEWE (12,5 %) then for the younger Mini-LEWE (8,7 %).

It is remarkable that inspite of the different areas of the zona glomerulosa there is hardly a difference of the nuclei areas of the zona glomerulosa cells.

No proof was found that there was a significant correlation between the length of the operations and the morphological parameters for all three groups.

In addition significant correlations were analysed between the morphological parameters and parameters of the systolic and diastolic blood pressure as well as of the heart rate. The blood pressure and the heart rate are found in positive correlation to the area of the glomeruli, the area of the Bowmans space as well as to the standard deviation of the Bowmans space.

In my opinion the rise of the standard deviation compared to its average in the kidney is the decisive factor to characterize the preceded stress.

The results show that even a short but severe change in the blood pressure and heart rate produce a change in the morphological structure of the kidney.

At this point it should be mentioned that humoral and nerval influences were unable to be take into consideration due to technical grounds and that the results are only valid for the tested animals.