CHAPTER V

SUMMARY

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Skeletal development is found to be influenced by several factors including nutritional status with regard to critical nutrients such as calcium, phosphorus, vitamin D, vitamin A and protein. Studies were made of the effects of dietary variations on skeletal development in rats as judged by the size and composition of the femur. The parameters measured were length, weight, dry weight, fat-free dry weight, ash and calcium content.

Neonatal undernutrition was found to result in decreased size, weight, ash and calcium content and increased moisture and fat contents. The A:R ratio was reduced.

Protein deficiency induced by a 5% protein diet fed during the immediate postweaning period was found to result in similar changes. However, the changes were less marked with undernutrition during the postweaning period which was not associated with an increase in moisture.

The effects of protein deficiency were found to depend on age and to be largely prevented by a diet containing 10% protein.

The effects of undernutrition were not evident with moderate undernutrition but were manifest when it was severe enough to result in weight loss.

The skeletal status of animals was found to be substantially improved by supplementing kodri, a millet of poor protein quality with lysine, the first limiting amino acid in the same. A similar improvement was found when wheat and maize were supplemented with bengal gram and fenugreek leaves.

Comparative data on animals fed a combination of cereal or millet + bengal gram + fenugreek leaves with the first component varied suggested the superiority of animals fed wheat, jowar and bajra as compared to those fed rice and maize. Animals fed these combinations were found to fare better than those fed 'Modern bread' or bread fortified with lysine, calcium and other nutrients.

The studies suggest that skeletal development is influenced by the protein and calorie status of the animal. The maturation of the skeleton is associated with a decrease in moisture and increase in mineral and this maturation would appear to be retarded by a low plane of protein nutrition. The results are consistent with other reports suggesting impaired formation of the bone matrix owing to poor osteoblastic activity resulting in poor bone mineralization. The studies are also consistent with observations of gross skeletal retardation in children suffering from kwashiorkor and marasmus and underline the importance of adequate protein nutrition for proper bone development.