TOPOGRAPHIC MODIFICATIONS AND GROWTH OF THE NASAL VENTRAL TURBINATE AND THEIR RELATIONS WITH THE RECEPTIVITY OF THE PIGLETS TO ATROPHIC RHINITIS ⁂

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Atrophic rhinitis (AR) must still be considered as an anatomopathological entity. The age of the piglets at the moment of infection is very important for the subsequent development of the characteristic lesions which primary consist in a decrease in bone formation.
Indeed, the receptivity is maximal before the 4th-5th first week of age. This particular receptivity of the piglets has been differently interpreted; one interpretation is the more rapidly osseous turn-over of the nasal ventral turbinates (NVT). In our knowledge, untill now nobody has studied the particular growth of the NVT.
We investigated the kinetic of ossification of its different parts between birth and 6 weeks of life by fluorescence microscopy and microradiography.

MATERIAL AND METHODS

A-Animals. In a litter of piglets naturally reared under a Landrace gilt purchased from a herd free of AR, 6 piglets were selectioned for their normal curve of growth.

B-Indicator for the complexometric determination of calcium. The initial marker was oxytetracycline (OTC) (50mg/KgW,IM) and the terminal marker was Alizarine red S (ARS) (80mg/KgW,IP). The experimental design adopted for the injection of the two markers is summarized in table 1.

injection of the markers (day)	Piglet nb. 1	2	3	4	5	6
OTC	1	1	8	8	22	29
ARS	8	15	40	29	36	43

C-Seven cross-sections in each undecalcified nose were made at different levels : the interval between the third incisor tooth and the canine tooth (IC), the canine tooth (C), the first premolar tooth (PM1), the rostral (r) and caudal (c) extremities of the 2nd and 3rd premolar teeth (rPM2, cPM2, rPM3, cPM3). The sections were brought to a thickness of 80u. Contact microradiographies were made and the sections were examined under UV light as previously described.

RESULTS

The topographic relations of the different parts of the nasal ventral turbinates evolue and itself modifies between birth and 6 weeks of life.

1-Articular lamina (AL)
Its osseous rostral extremity is situated at the level of the PM1 at birth and reaches, six weeks later, the interval IC. This particularly important rostral osseous growth is accompagnied with a relative movement in direction of the palate. Behind, growth slows down and is palato-lateral directed.

2-Transverse lamina (TL)
During the 3 first weeks of life, the region of the TL situated in front of the PM2 grows rapidly in direction of the palate. From the 4th week on, only the rostral part of TL till the level of the C remains this rapid growth. Behind the C, the intensity of the osseous turn-over fails down and takes place in direction of the palate in the lateral extremity of the TL. However, during the 4th week, the direction of the growth of the medial extremity of the TL changes, so that the medial extremity undergoes a relative shift in direction of the frontal bones. This rotation movement does not reach the caudal extremity of the TL, which grows in direction of the palate in order to permit the formation of the caudal blind alley.

3-Scrolls
The relative volume occupied by the scrolls in the nasal cavities increases with the age of the piglets.
The attaching area of the scrolls to the TL presents a rapid medial growth only during the two first weeks of life and only in the region situated in front of the PM1. Elsewere and later, the attaching area is particularly stable.
During the two first weeks, the palatine and frontal scrolls, except the distal third of the curved portion with large radius of the frontal scrolls grow rapidly. The growth is excentric and the distal extremities grows longer, involving a relative increase of the dimensions of the scrolls in comparison with the nasal cavities. From the rostral extremity of the PM3, growth becomes concentric in the frontal scroll from the distal third of its large radius curved portion to its distal extremity.
From the third week of life, growth in the scrolls slows down in areas which increase in the rostro-caudal direction. In the rostral extremity, the slow growth is limited to the large radius curved portion of the palatin scroll. Behind, at the level of the PM1, it extends also in the area parallel to the medial septum of the nose and in the distal third of the large radius curved portion of the frontal scroll. Finally, at the level of the caudal extremity of the PM2, growth is slow in all the areas of the scrolls, except in the small radius curved portion of the frontal scroll. The direction of the growth is also concentric from the distal third of the portion of the frontal scroll with large curvature radius to the distal extremity, but only from the caudal extremity of the PM2, which permits by this way a slow unrolling of the large radius curved portion of the frontal scroll.

DISCUSSION AND CONCLUSIONS

1. Microradiographic analysis associated with the fluorescence microscopy of undecalcified bones of animals who received different fluorescent calcification markers is presently the most suitable method to study growth phenomena and the remodelling of the squelettal tissues.

2. Nevertheless, in spite of the precision of todays methods, we can only observe the growth of the NVT. Microscopic examination does not provide enough information to understand the mechanisms responsible of that growth and their eventually disorders.

3. The NVT, contrary to the dorsal turbinate, is an independant bone and is maintained by means of soft tissues and is totaly deprived of muscular influences. The turbinate's growth is thus independant of its neighbouring bones. This suggests the existence of a proper regulatory mechanism. For these reasons, the determinism of the growth of the NVT is probably of genetic origin.

4. The prominant lesions of AR in the rostral part of the NVT reported previously can be explained by the more important osseous turn-over in the same area during the two first weeks of life. Consequently, every physiopathological processus interfering with the intensive renewing of the ossification can lead to the development of the characteristic lesions of AR

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