Recent developments in interferon research: Conclusion

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Even though we know today that interferons are involved not only in antiviral, but also in antiproliferative, antibacterial and antiparasitic defense mechanisms, we do not understand why these molecules may also be associated with or participate in certain diseases such as, for example, certain autoimmune diseases or AIDS. In addition, it is still a mystery why interferons, within the complex network of cytokines, stimulate certain cellular growth or differentiation processes and inhibit others. We are just beginning to open the black box of the mechanism of action and are far from understanding these complex events. This is partly due to the constantly growing cytokine network in which interferons are embedded and the tightly interlinked actions within the network, some members of which have only been described in recent years and are less thoroughly understood than interferon itself. The mechanism of action of interferon can no longer be studied in isolation from the other cytokines, which makes research in this field much more complicated than anticipated a few years ago. Interferons remain a fascinating group of molecules, within the superfamily of cytokines, and are very likely to provide as many surprises in the future as they have in the past.

Research Articles

Different intrafusal fiber composition of spindles in sheep and pig extraocular muscles[1]

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Summary. Histochemical profiles of intrafusal fibers have been examined in muscle spindles of extraocular muscles of sheep and pig. Results show that in the sheep the intrafusal content presents, in addition to chain fibers, at least one bag_1 and one bag_2 fiber, whereas in the pig almost all the spindles are bag_1-fiber spindles.
Key words. Extraocular muscles; sheep; pig; histochemistry.

The extraocular muscles (EOMs) of both sheep and pig contain large numbers of muscle spindles[2-5]. The cell bodies of these stretch-sensitive afferents lie in the trigeminal ganglion and their localization has been established by retrograde transport of horseradish peroxidase and electrophysiological techniques[6,7]. The structure of EOM spindles in the sheep has been examined by Harker[8], and Kubota[9] has recently observed pig EOM spindles using the electron microscope. While examining the histochemistry of the fibers of EOMs of sheep and pig in our laboratory, we observed a difference between the intrafusal muscle fibers of the two species. The purpose of the present study was therefore to investigate and compare the histochemical profile of the intrafusal fibers in the EOM spindles of sheep and pig. Some morphological details about these spindles are also given. A preliminary report has been presented[10].

Materials and methods

The rectus superior (RS) and the obliquus superior (OS) muscles were rapidly dissected from 3 sheep and 3 pigs which had been sacrificed with an overdose of sodium pentobarbital. The muscles were frozen by immersion in isopentane cooled with liquid nitrogen. Serial cross sections were cut at 10 µm on a cryostat microtome at − 20 °C and processed for histochemical demonstration of myosin ATPase (m-ATPase) with alkaline and acid preincubation according to system A by Snow et al.[11]. Formalin fixation according to Hayashi and Freiman[12] was also performed on serial sections for 5 min at 4 °C, pH 7.8; these slides were then extensively rinsed prior to incubation (30 min at room temperature, pH 9.4). The nuclear bag_1, the nuclear bag_2 and the nuclear chain intrafusal muscle fibers were identified according to their staining properties with the two ATPase reactions[13].

Results and discussion

The RS and OS muscles presented a large number of spindles in both the species examined. There was a compartmentalization of receptors; spindles were found mostly in the region containing the highest concentration of small fibers, i.e. in the orbital region of the RS, and