

## The curious asymmetry of flatfish

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Flatfish are known to be the most asymmetrically-shaped vertebrates of the planet. Although they start as a symmetric larva, this symmetry gets lost during metamorphosis due to the migration of one eye across the top of the head onto the other side and linked craniofacial remodeling, resulting in a blind and an eye side. The blind side is non-pigmented and glides over the seabed. The eye side faces the water column and is pigmented, showing colors resembling the seabed. The difference in pigmentation between the eye and blind side is well-studied but information on possible morphological, functional or histological differences is rather scarce.

Hence, this study, aimed to obtain more information on possible histological differences between both sides. Sections of normal skin of both sides (pigmented and non-pigmented) of 20 common dab (*Limanda limanda*) fish were histologically examined. A H&E staining was used to determine the thickness of the epidermal layer and a PAS staining to count the number of mucus producing goblet cells.

The epidermal layer was  $49.8 \pm 16.0 \mu\text{m}$  on the pigmented side and  $52.3 \pm 13.0 \mu\text{m}$  on the non-pigmented side. The number of goblet cells was also comparable with on average  $5.7 \pm 3.4$  cells on the pigmented side and  $5.2 \pm 2.7$  cells on the non-pigmented side.

In contrast, Faílde et al. (2017) already reported more goblet cells on the eye side. The variation between different fish was considerable and will be studied in more detail whereby differences such as age, length, condition and gender will be taken into account to eliminate possible bias.

The hitherto obtained results combined with previously published results, might suggest that differences in pigmentation might be the only morphological difference between the eye and blind side of common dab. Nevertheless, other parameters such as tight junctions, differences in collagen, possible differences in the basement membrane, etc... should be examined.

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