The dorsal longitudinal fasciculus (DLF) (not to be confused with the medial longitudinal fasciculus, nor the superior longitudinal fasciculus) is a white matter fiber tract located within the brain stem, specifically in the dorsal brainstem tegmentum. The DLF travels through the periaqueductal gray matter. The tract is composed of a diffuse brainstem pathway located in the periventricular gray matter comprising ascending visceral sensory axons and descending hypothalamic axons.

As with all white matter tracts, the DLF consists of myelinated axons carrying information between neurons. The DLF, carries both ascending and descending fibers, and conveys visceral motor and sensory signals.

Ascending fibers

The DLF ascending tract has its origins in nuclei of the reticular formation. These fibers synapse onto the hypothalamus and carry visceral information to the brain.

Brainstem afferents in DLF include fibers coming from the parabrachial area, which conveys taste & general visceral sensation to the hypothalamus from the nucleus of the tractus solitarius in the medulla. Afferents distribute to the posterior nucleus and periventricular nuclei of the hypothalamus.
Descending fibers

The descending portion of the DLF originates in the hypothalamus. These fibers then descend through the brain stem periaqueductal gray matter along the base of the fourth ventricle. These fibers continue on into the spinal cord where they synapse with preganglionic autonomic neurons.

Hypothalamic efferents in DLF arise from the paraventricular nucleus, supraoptic nucleus and periventricular nucleus, and send information to multiple areas, including:

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  1) midbrain central gray for pain modulation,
  2) the medullary autonomic centers for heart rate, blood pressure, and
respiration,
  3) the ventral tegmental area,
  4) brainstem parasympathetic nuclei (dorsal motor nucleus of the Vagus and
salivatory nuclei for the eyes),
  5) thoraco-lumbar preganglionic sympathetic neurons, and
  6) lumbo-sacral preganglionic parasympathetic neurons.
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Note that at least some of the output from the hypothalamus lies outside of the DLF, within a set of Descending Hypothalamic Fibers running next to the spinothalamic tract; lesions of this area canonically lead to ipsilateral Horner's syndrome.