The present work shows the results of a series of experimental investigations of the wake development behind a model rotor subject to upstream disturbances created either by another rotor or by a disk. The experiments are carried out in a water flume in order to control the flow and to carry out visualizations and to perform optical diagnostics. The aim of the work is to clarify similarities and differences in the wake of a wind turbine subject to different inflow disturbances, and in particular to see if there is any difference in the rotor wake resulting from an upstream disturbance created by a rotor and one created by an immobile disk. The background for the study is an on-going discussion if disks can replace rotors in laboratory experiments. In the paper, we will also show new experimental data that support our main conclusion, which is that strong differences exist between the near wakes characteristics of a rotor and a disk.