Most marine plankton have a high energy (carbon) density, but some are gelatinous with approximately 100 times more watery bodies. How do those distinctly different body plans emerge, and what are the trade-offs? We address this question by modeling the energy budget of planktonic filter feeders across life-forms, from micron-sized unicellular microbes such as choanoflagellates to centimeter-sized gelatinous tunicates such as salps. We find two equally successful strategies, one being small with high energy density (dense dwarf) and the other being large with low energy density (gelatinous giant). The constraint that forces large—but not small—filter feeders to be gelatinous is identified as a lower limit to the size-specific filter area, below which the energy costs lead to starvation. A further limit is found from the maximum size-specific motor force that restricts the access to optimum strategies. The quantified constraints are discussed in the context of other resource-acquisition strategies. We argue that interception feeding strategies can be accessed by large organisms only if they are gelatinous. On the other hand, organisms that use remote prey sensing do not need to be gelatinous, even if they are large.