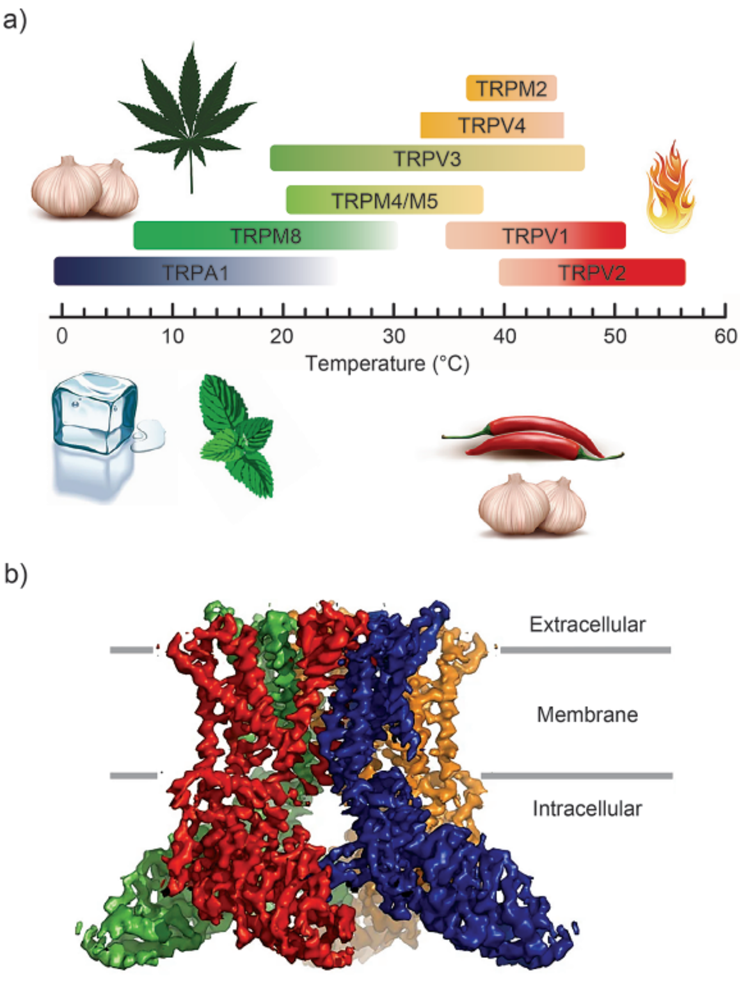

Figure 1.13 Temperature-sensitive TRP channels. (a) Sensitive temperature ranges for open probabilities of TRP channels. The TRP channels are also activated by chemical ligands, including active ingredients such as allicin (in garlic), cannabinoids (in cannabis), menthol (in mint), and capsaicin (in chili pepper). Adapted from Castillo et al. (2018) *Phys. Biol.*, **15**, 021001 / IOP Publishing. (b) Cryo-electron microscopy reconstruction of TRPV4 as a representative. Deng et al. (2018) *Nat. Struct. Mol. Biol.*, **25**, 252–260 / Springer Nature.

1.3 Significance of Intracellular Thermometry

Just as humans maintain a body temperature higher than the environment, so do cells spontaneously produce heat. Heat-induced formation of stress granules in the cytoplasm and expressions of TRP channels in the plasma membrane hint that a detectable temperature variation might take place within a single cell. Accurate intracellular temperature measurements will enable the comparison of temperature-involving biological events between individuals and cells and the monitoring of temperature-related biological phenomena at the single-cell level. The elucidation of profound mechanisms of thermal biology described in Sections 1.1 and 1.2 has motivated us to explore the temperature inside living cells.

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