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Oral Peri-Receptor Events Affecting Salt Taste Sensitivity

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Although dietary salt intake is essential for vertebrates in the homeostatic regulation of water balance, osmotic pressure and nerve conductance, excess of sodium chloride (NaCl) intake has been correlated to cardiovascular and renal diseases. To efficiently develop low sodium foods without compromising on salt taste quality, the present study investigated inter-individual salt taste sensitivity in context with oral mechanisms involved in salivary peri-receptor events and sodium-induced ion pharmacology. 35 Healthy panellists were screened in their full detection functions for NaCl and classified according to their sensitivity. Highly sensitive (S+) and non-sensitive panellists (S-) were challenged with a series of salt stimuli and saliva collected. Time-dependent changes in the salivary proteome were then analysed by tryptic in-solution digestion, iTRAQ labelling and nano-LC-MS/MS. Dynamics upon stimulation and differential proteome pattern between sensitivity groups seemed to be two largely independent conditions. Sensitivity relied on subjects' initial salivary conditions whereas a tastant stimulation triggered the release of antimicrobial proteins. Marker proteins indicative of the S+ and S- groups demonstrated a highly significant enrichment in contrasting biological functions, e.g. the S+ group exhibited significant enrichment in endopeptidase activity whereas S- subjects showed high abundance in proteins with endopeptidase inhibitor activity. To further investigate the inter-individual variability in NaCl sensitivity, 20 volunteers were sensorially classified, saliva samples collected and analysed using targeted protein quantitation. The joint abundance of lipocalin-1 and lysozyme C was found to be highly indicative for a decreased NaCl sensitivity. At the same time, a serine-type endopeptidase was shown for the first time to exhibit a salt enhancing effect which could further be assigned to an in-vivo release of salt-modulating peptides through digestive salivary processes.