Ovomucoid (OMC) is the most prominent allergen causing egg allergy, and contains disulfide (S-S) bonds that may be responsible for its allergic action. As S-S bonds may be reduced during electrolysis on the cathode side, this study was undertaken to evaluate modulation of the allergic action of OMC after electrolysis. A current of 30 mA/cm² was applied. The allergic action was evaluated by means of skin prick tests (SPT) with egg-allergic patients, and the modification of OMC was examined by MALDI-ToF-MS after tryptic digestion. The total free SH groups in 1% OMC solution were increased on the cathode sides after electrolysis for 30 minutes (14.8 nmol/ml) as against those of untreated OMC (1.2 nmol/ml) and OMC on the anode side (2.8 nmol/ml). Significant mitigation of the wheal reactions by 22% were observed in the SPT with OMC on the cathode when compared with those for untreated OMC; however, the wheal reactions on the anode side did not differ from those for untreated OMC. The MALDI-ToF-MS results for untreated OMC or OMC on the anode side showed two peptide fragments suspecting potential S-S bonds (residues 63L-85S, 358A-379R) but, on the contrary, OMC on the cathode side did not give the fragments suspecting potential S-S bonds. The allergic action of OMC can be mitigated during electrolysis on the cathode side, being simultaneously formed intramolecular free SH groups. This study was supported by the Kieikai, Tokyo, and a Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science.

Background and Aims Food hypersensitivity is a common cause of digestive symptoms in neonates. To confirm the diagnosis of neonatal cow’s milk allergy (CMA), an oral food challenge (OFC) test should be conducted. However, many neonatologists in Japan avoid OFC because of excessive anxiety regarding induction of severe symptoms and continue to feed babies therapeutic formula without an accurate diagnosis. We conducted a prospective multicenter survey in which the standardized OFC was required in neonates with mild symptoms suggesting CMA.

Methods Neonates presenting with digestive symptoms suggesting CMA and who underwent OFC were enrolled between April 2010 and September 2011. Neonates with severe complications, inborn disorders or severe symptoms at the onset, such as anaphylaxis, mass gastrointestinal bleeding, or perforation, were excluded. This study was conducted as a multicenter survey of major NICUs in Japan.