BACKGROUND: Allergic sensitisation to foods may occur in infancy without prior oral exposure to the offending food, leading to the assumption that food allergy sensitisation may occur through the skin. Concerns have been raised regarding the safety of use of personal care products containing hydrolysed wheat proteins, since these products have been shown to induce allergy through the skin, and even cause an abrogation of an already established oral tolerance.

OBJECTIVE: To establish an animal model for food allergy skin sensitisation and compare the sensitising capacity of an unmodified and an acid-hydrolysed gluten product via slightly damaged skin in naïve versus tolerant rats.

METHODS: Gluten products were applied on the slightly damaged skin of naïve or tolerant Brown Norway (BN) rats without adjuvant 3 times per week for 3 or 5 consecutive weeks. The effect of the skin applications was evaluated by means of different ELISAs and immunoblotting.

RESULTS: A robust animal model was developed for food allergy skin sensitisation. In naïve rats, both gluten products were able to induce a statistically significant level of specific antibodies and sensitise through the skin, but in the wheat-tolerant rats, only the acid-hydrolysed gluten was able to sensitise through the skin, albeit at a level much lower than in the naïve rats. Results showed that new epitopes had been developed as a result of acid hydrolysis but original epitopes were maintained. This may explain why only the acid-hydrolysed gluten could induce specific antibody responses in the tolerant animals.

CONCLUSIONS: This study showed that it is possible to sensitise BN rats through slightly damaged skin, and that the sensitising capacity is heavily influenced by the tolerance status of their immune system and the degree of modification of the wheat products.