

4th International Summit on

GMP, GCP & Quality Control

October 26-28, 2015 Hyderabad, India



Sunil Kumar Verma

CSIR-Centre for Cellular and Molecular Biology, India

Horsemeat scandal: A lesson to be learnt from 'numts'

Previously, the 'Sushigate' fish scandal of Florida and now the Europe-wide scandal over the contamination of beef products with horsemeat and, in some cases pork, has thrown the Food Standards Agency into the headlines. The methodology that revealed this scandal is mainly based on DNA barcoding of confiscated beef products involving amplification of small fragment of mitochondrial 'Cytochrome b' gene or 'Cytochrome C Oxidase 1' gene using universal primers. It has been shown before that the Nuclear Mitochondrial Pseudogenes (numts) can introduce serious ambiguity into DNA barcoding results leading to false detection of many species in one. While amplifying the mitochondrial genomes of *Bubalus bubalis* (Buffalo) (Genbank Accession No. AF547270.1) and *Platanista gangetica* (Gangetic dolphin) using a universal primer system, we had detected a specific numt in dolphin DNA, which had high similarity scores with *Sus* (porcine) mitochondrial DNA rather than that with the dolphin mtDNA sequences available in nr nucleotide database of NCBI, leading to a serious confusion. On the first hand, we also suspected it to be a contamination of pig DNA in dolphin DNA preparations. However, careful re-analysis of the sequences identified this contaminating sequence as a numt, which might have had translocated and integrated to dolphin nuclear genome prior to the divergence of this species from *Sus-Bovine* lineage. Since the horse (*Equus*), pig, buffalo and dolphin all belong to Laurasiatheria lineage, the co-amplification of numt could also appear as contamination and adulteration of pig and horse in beef products. This, however, needs to be assessed and taken into consideration while DNA testing is done for food purity testing in particular by the use of DNA barcode system.

Biography

Sunil Kumar Verma is an Indian Biologist and, as of January 2015, the Principal Scientist at the Centre for Cellular and Molecular Biology, Hyderabad, India. He is primarily known for his contributions to the development of "universal primer technology" that can identify any bird, fish, reptile or mammal from a tiny biological sample, and satisfy legal evidence requirements in a court of law. This technology has received 12 international patents and it has revitalized the field of wildlife forensics, species identification and DNA based meat adulteration testing and is now going with the name of DNA barcoding across world. He received his DPhil in Medical Oncology from the University of Oxford, and has received several national awards, including the 2008 CSIR Technology Award, the 2009 NRDC Meritorious Invention Award and the 2009 BioAsia Innovation Award in recognition of his contribution to Indian science and technology.

sunilverma@ccmb.res.in

Notes: