

Role of vaccine contamination with aquaporin-4 containing chick embryo cell culture in the etiology of neuromyelitis optica spectrum disorders

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Background

Autoimmunity against aquaporin-4 (AQP4) has been associated neuromyelitis optica spectrum disorders (NMOSD).¹ Vaccines such as measles, mumps and rubella (MMR)² and tick-borne encephalitis (TBE) are prepared using chick embryo cell culture. The role of MMR contamination with GAD65 containing chick embryo cell culture in type 1 diabetes was previously described.³

AQP4 is expressed during chicken embryogenesis.⁴

Method

AQP4 *Gallus gallus* (chicken) protein sequence was obtained from Uniprot.⁵

BLASTP was used to determine homology to human AQP4.⁶

Results

AQP4 protein comparison between human and chicken reveals 86% sequence homology as shown below.

PREDICTED: aquaporin-4 isoform X1 [*Gallus gallus*]
[XP_015133432.1](#) 323 1

[GenPeptGraphics](#) [Next Match](#) [Previous Match](#)

Alignment statistics for match #1

Score	Expect	Method	Identities	Positives	Gaps
581 bits(1498)	0.0	Compositional matrix adjust.	278/323(86%)	299/323(92%)	0/323(0%)
Query 1		MSDRPTARRWGKCGPLCTRENIMVAFKGVWTQAFWKAVTAEFLAMLIFVLLSLGSTINWG			60
		MSDR A R GKC LC E+IMVAFKGVWTQ FWKAV+AEFLAMLIFVLLSLGSTINWG			
Sbjct 1		MSDRAAAPRRGKCARLCKCESIMVAFKGVWTQPFWKAVSAEFLAMLIFVLLSLGSTINWG			60
Query 61		GTEKPLPVDMLVLSLFCGLSIATMVQCFGHISGGHINPAVTVAMVCTRKISIAKSVFYIA			120
		G+EKPLPVDMLVLSLFCGLSIATMVQCFGHISGGHINPAVTVAMVCTRKIS+AKSVFYI			
Sbjct 61		GSEKPLPVDMLVLSLFCGLSIATMVQCFGHISGGHINPAVTVAMVCTRKISLAKSVFYIL			120
Query 121		AQCLGAIIGAGILYLVTTPPSVVGGLGVTMVHGNTAGHLLVELIITFQLVFTIFASCDS			180
		AQCLGAI+GAGILYL+TPPSVVGGLGVT VHG+L+AGHLLVELIITFQLVFTIFASCDS			
Sbjct 121		AQCLGAIIVGAGILYLITPPSVVGGLGVTAVHGDLSAGHLLVELIITFQLVFTIFASCDS			180
Query 181		KRTDVTGSIALAIGFSAIGHLFAINYTGASMNPARSFGPAVIMGNWENHWIYWVGPIIG			240
		KR+DVTGS+ALAIIGFSAIGHLFAINYTGASMNPARSFGPAVIMG WEN W+YWVGPIIG			
Sbjct 181		KRSDVTGSVALAIGFSAIGHLFAINYTGASMNPARSFGPAVIMGKVENQWVYWVGPIIG			240
Query 241		AVLAGGLYEYVFCPDVEFKRRFKEAFSAAQQTKGSYMEVEDNRSQVETDDLILKPGVVH			300
		AVLAG LYEYV+CPD+E KRRFK+ FSKA Q +KG Y+EV+D RS VETDDLILKPG+VH			
Sbjct 241		AVLAGALYEYVYCPDMELKRRFKDVFASKATQPSKGYIEVDDTRSHVETDDLILKPGIVH			300

Query 301 VIDVDRGEEKKGDQSGEVLSSV 323
VID+DR E+KKG+D S EVLSSV
Sbjct 301 VIDIDRSEDKKGRDPSEVLSSV 323

Discussion

The results above provide strong evidence that chicken embryo cell culture proteins in vaccines can cause the development of antibodies against chicken AQP4 which cross-react with human AQP4 protein to cause NMOSD.

This is very similar to the Pandemrix vaccine causing narcolepsy.⁷

This is also similar to neuroparalytic accidents described following administration of vaccines contaminated with rabbit or duck embryo neural tissue.⁸

Action

Vaccine design and safety processes have fundamental problems that need to be immediately addressed to avoid such devastating consequences.⁹

References

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