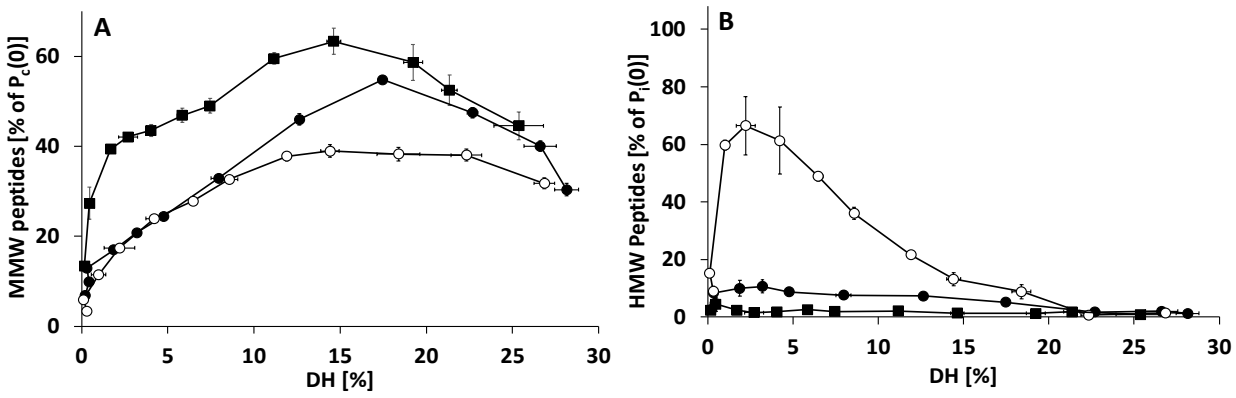
Electronic Supplementary Material (ESI) for Food & Function.

Supplementary material

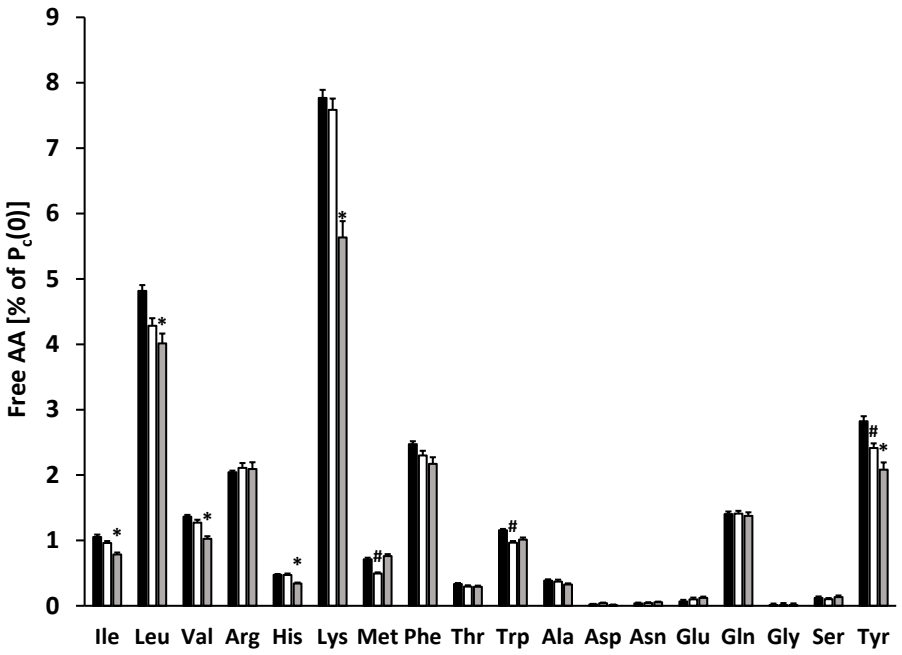
Supplementary table 1. Degree of protein hydrolysis, free amino acid and peptide content of undigested milk protein solutions and after gastric digestion in SIM[1].

	NWPI		DWPI		PBI	
	MPS	**G120**	**MPS**	**G120**	**MPS**	**G120**
DH *(%)*	0	0.22 ± 0.04	0	0.31 ± 0.07	0	0.17 ± 0.01
LMW *(% of $P_c(0)$)*	0.13 ± 0.03	0.24 ± 0.02	0.09 ± 0.03	0.17 ± 0.06	0.91 ± 0.05*	1.01 ± 0.04*
FAA *(% of $P_c(0)$)*	0	0.06 ± 0.03	0	0.06 ± 0.03	0	0.13 ± 0.02
MMW *(% of $P_c(0)$)*	4.79 ± 1.07	6.91 ± 0.14	3.69 ± 0.90	3.40 ± 0.35	9.20 ± 0.47*	13.37 ± 0.57*
HMW *(% of $P_c(0)$)*	0	2.63 ± 0.75	0	9.05 ± 1.56#	0	2.29 ± 0.28

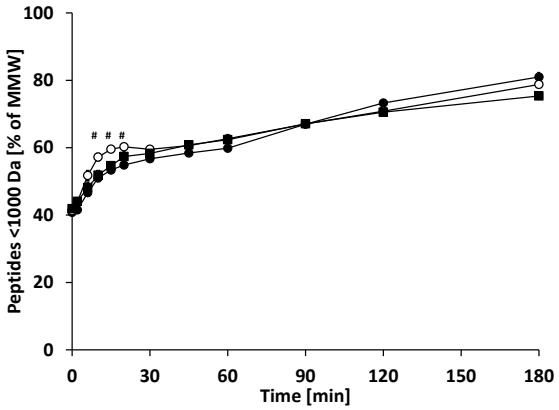
[1]Means ± SEM, n=3. SIM = semi-dynamic *in vitro* model of the gastrointestinal tract. MPS = milk protein solution. G120 = end of gastric digestion (t=120 min). DH = degree of hydrolysis, LMW = low molecular weight peptides, FAA = free amino acids, MMW = medium molecular weight peptides, HMW= high molecular weight peptides. NWPI = native whey protein isolate, DWPI = denatured whey protein isolate, PBI = protein base ingredient. % of $P_c(0)$ = weight percentage of crude protein amount at t=0. * significant difference PBI vs. NWPI ($P<0.05$); # significant difference NWPI vs. DWPI ($P<0.05$).



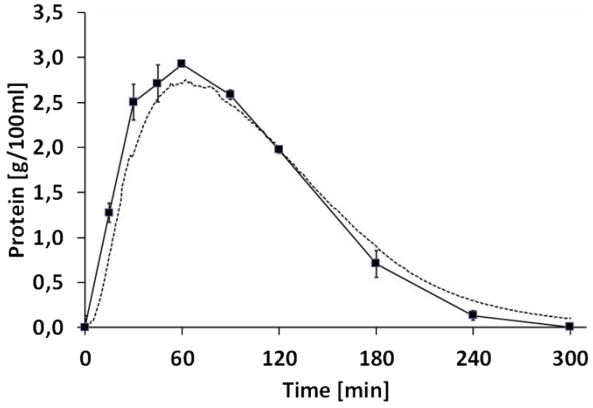
Supplementary Figure 1. Intermediate digestion products in the intestinal phase of SIM as function of digesta degree of hydrolysis. ℘) native whey protein isolate (NWPI), ☙) denatured whey protein isolate (DWPI), **O**) protein base ingredient for infant formula (PBI). A) Medium molecular weight peptides (MMW, 0.5-5 kDa) as determined by HP-SEC expressed as weight % of the crude protein ($P_c(0)$). B) High molecular weight peptides (HMW, 5-13 kDa) expressed as % of the intact milk protein content at t=0 ($P_i(0)$) as determined by SDS-page and densiometric analysis. Mean ± SEM (n=3).



Supplementary Figure 2. Fee individual amino acids released in SIM digestion at t180 intestinal digestion. Black bars: native whey protein isolate (NWPI), white bars: denatured whey protein isolate (DWPI), grey bars: protein base ingredient for infant formula (PBI). Means ± SEM. # significant difference NWPI vs. DWPI ($P<0.05$). * significant difference PBI vs. NWPI ($P<0.05$). SIM = semi-dynamic *in vitro* model of the gastrointestinal tract.



Supplementary Figure 3. Composition of intermediate digestion products; medium molecular weight peptides (MMW, 0.5 - 5 kDa) in SIM intestinal digesta. Weight proportion of MMW peptides <1000Da. ℘) native whey protein isolate (NWPI), ☙) denatured whey protein isolate (DWPI), **O**) protein base ingredient for infant formula (PBI). Mean ± SEM (n=3). # significant difference NWPI vs. DWPI ($P<0.05$). SIM = semi-dynamic *in vitro* model of the gastrointestinal tract.



Supplementary Figure 4. Milk protein concentration in TIM-1 duodenum, Dotted line calculated based on mean logged actual gastric emptying curve, **O**) measured using dumas and corrected for blank run protein levels. Displayed are means ± standard deviation.