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Efficacy of ginger (zingiber officinale) in ameliorating chemotherapy-induced nausea and vomiting and chemotherapy-related outcomes: a systematic literature review update and meta-analysis

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a systematic literature review and meta-analysis

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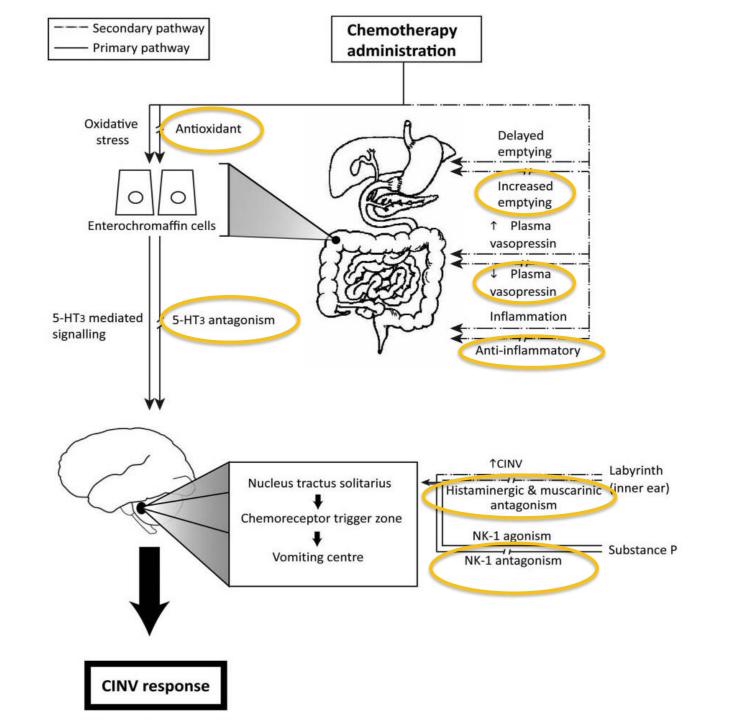
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What's the issue?

- Fatigue
- Loss of appetite
- Weight loss
- Nausea + vomiting
- Decreased QoL
- Depression
- Anxiety
- Gl symptoms

- ↓ QoL
- ↓ oral intake
- Malnutrition
- Treatment cessation
- Mortality





Source: Marx, W., Ried, K., McCarthy, A., Vitetta, L., Sali, A., McKavanagh, D., Isenring, E. 2017. Ginger – Mechanism of action in chemotherapy-induced nausea and vomiting: a review. *Critical Reviews in Food Science and Nutrition*, 57(1), 141-146.



Evidence for Ginger for CINV

Ginger (*Zingiber officinale*) and chemotherapy-induced nausea and vomiting: a systematic literature review

Wolfgang M Marx, Laisa Teleni, Alexandra L McCarthy, Luis Vitetta, Dan McKavanagh, Damien Thomson, and Elisabeth Isenring



N=7 studies
Qualitative analysis
Mixed support for use of ginger

Ginger as an Antiemetic Modality for Chemotherapy-Induced Nausea and Vomiting: A Systematic Review and Meta-Analysis

Jiyeon Lee, RN, PhD, ACNP-BC, and Heeyoung Oh, RN, PhD

N=5 studies Meta-analysis No significant effect of ginger

Standard recommendations for use of ginger for CINV in the

clinical setting not warranted.



Study Aim



To evaluate the **efficacy** of ginger supplementation in the prevention and management of CINV.



Method

- 5 electronic databases searched
- From database inception to April 2018
- Data pooled (meta-analysis)
- Study quality assessed (Cochrane ROB Tool)
- Quality of body of evidence evaluated (GRADE)



Method – Study Characteristics

Included

- Any language
- Age >18 years
- Chemotherapy patients
- Intervention of ginger
- Comparator of placebo or standard care alone

Excluded

- Radiation
- Unable to be translated to English
- Receiving other interventions as comparator



Results – Search

Records identified through database searching (n=203)

Additional records identified through snowballing (n=2)

Additional records identified in previous SLR (n=5)

Records screened title and abstract only (n=210)

Duplicates removed (n=89) Records excluded (n=84)

Full-text papers assessed for eligibility (n=37)

Full-text papers excluded (n=19)

Papers included in qualitative synthesis (n=18)

Papers included in meta-analysis (n=13)



Results – Study Quality (Risk of Bias)

Zick 2009	Yekta 2012	Thamlikitkul 2017	Shokri 2017	Sanaati 2016	Ryan 2012	Panahi 2012	Muthia 2013	Montazeri 2013	Marx 2017	Manusirivithaya 2004	Li 2018	Konmun 2017	Fahimi 2011	Danwilai 2017	Bossi 2017	Arslan 2015	Alparsian 2012	
•	•	•	?	•	•	•	?	•	•	•	?	•	?	•	+	?	?	Random sequence generation (selection bias)
•	?	?	?	•	?	•	?	?	•	?	?	?	?	?	?	•	?	Allocation concealment (selection bias)
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	+	•	•	Blinding of participants and personnel (performance bias)
•	•	•	+	•	•	•	•	•	•	•	•	•	•	•	+	•	•	Blinding of outcome assessment (detection bias)
•	•	•	?	•	•	•	?	•	•	•	•	•	?	+	?	?	?	Incomplete outcome data (attrition bias)
•	•	+	+	•	+	•	•	?	?	•	•	•	•	•	+	+	•	Selective reporting (reporting bias)
+	•	+	+	•	•	•	•	•	+	+	•	•	+	+	•	+	+	Other bias



Results – Study Samples

Total No. participants	1652							
Sample sizes	20-375							
Female	64%							
Country	Iran (n=6 studies), Thailand (n=4), USA (n=2), Turkey (n=2), Italy, Indonesia, China, Australia (n=1)							
Cancer	Breast (n=9), lung (n=2), ovarian (n=2), other (gastrointestinal, haematological, unspecified) (n=5)							
CTx type	Platinum-based (n=8); anthracycline-based (n=6); unspecified (n=4)							
CTx emetogenicity	Moderate and/or high (n=8); unspecified (n=10)							
CTx regimen	Single-day (n=6); unspecified (n=12)							
Anti-emetics	Coticosteroid + 5 -HT $_3$ receptor antagonist (n=6); Coticosteroid + 5 -HT $_3$ receptor antagonist + other (n=7); aprepitant + 5 -HT $_3$ receptor antagonist (n=2); unspecified (n=3)							



Results – Nausea Incidence

	Ging	er	Compa	rator		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Alparsian 2012	0	15	23	30	33.2%	0.01 [0.00, 0.19]	-
Bossi 2017	65	121	63	123	0.0%	1.11 [0.67, 1.83]	
Fahimi 2011	17	36	19	36	0.0%	0.80 [0.32, 2.02]	
Konmun 2017	30	40	37	41	0.0%	0.32 [0.09, 1.14]	
Li 2018	46	71	45	69	0.0%	0.98 [0.49, 1.97]	
Panahi 2012	16	37	21	41	24.2%	0.73 [0.30, 1.77]	
Shokri 2017	8	20	14	29	14.7%	0.71 [0.23, 2.26]	
Zick 2009	35	53	31	57	0.0%	1.63 [0.75, 3.53]	
Zick 2009b	29	52	31	57	28.0%	1.06 [0.50, 2.25]	+
Total (95% CI)		124		157	100.0%	0.58 [0.36, 0.92]	•
Total events	53		89				
Heterogeneity: Chi ² =	10.05, dt	f = 3 (F	0.02	$I^2 = 70$	0%	<u> </u>	1 0 1 1 10 1000
Test for overall effect:	Z = 2.30	(P = 0	0.02)			0.00	1 0.1 1 10 1000' Favours Ginger Favours Comparator

>1g/day for any duration significantly reduced odds of overall nausea incidence by 42%.

GRADE level: very low

	Ging	er	Compa	rator		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Alparsian 2012	0	15	23	30	17.7%	0.01 [0.00, 0.19]	
Bossi 2017	65	121	63	123	32.9%	1.11 [0.67, 1.83]	-
Fahimi 2011	17	36	19	36	0.0%	0.80 [0.32, 2.02]	
Konmun 2017	30	40	37	41	10.4%	0.32 [0.09, 1.14]	
Li 2018	46	71	45	69	18.3%	0.98 [0.49, 1.97]	-
Panahi 2012	16	37	21	41	12.9%	0.73 [0.30, 1.77]	
Shokri 2017	8	20	14	29	7.8%	0.71 [0.23, 2.26]	
Zick 2009	35	53	31	57	0.0%	1.63 [0.75, 3.53]	
Zick 2009b	29	52	31	57	0.0%	1.06 [0.50, 2.25]	
Total (95% CI)		304		333	100.0%	0.73 [0.53, 1.00]	•
Total events	165		203				
Heterogeneity: Chi² =	13.04, d	f = 5 (F	0.02	$ 1^2 = 62$	2%		0.01 0.1 10 100
Test for overall effect:	Z = 1.94	(P = 0	.05)				0.01 0.1 1 10 100 Favours Ginger Favours Comparator

Any dose for >3-days
duration significantly
reduced odds of overall
nausea incidence by 27%.

GRADE level: very low



Results – Vomiting Incidence

	Ging	er	Compa	rator		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Fahimi 2011	26	36	28	36	10.5%	0.74 [0.25, 2.17]	
Konmun 2017	9	40	28	41	29.1%	0.13 [0.05, 0.36]	
Li 2018	11	71	15	69	17.4%	0.66 [0.28, 1.56]	
Manusirivithaya 2004	27	43	25	43	12.6%	1.22 [0.51, 2.89]	
Panahi 2012	12	37	12	41	0.0%	1.16 [0.44, 3.04]	
Thamlikitkul 2017	9	34	10	34	10.0%	0.86 [0.30, 2.50]	
Yekta 2012	2	40	8	40	10.3%	0.21 [0.04, 1.06]	-
Zick 2009	19	53	12	57	10.1%	2.10 [0.90, 4.90]	 •
Zick 2009b	15	53	12	57	0.0%	1.48 [0.62, 3.54]	
Total (95% CI)		317		320	100.0%	0.70 [0.50, 1.00]	•
Total events Heterogeneity: Chi ² = 2	103 0.85, df	= 6 (P	126 = 0.002)	$; I^2 = 7;$	1%		
Test for overall effect: 2							0.05 0.2 1 5 20 Favours Ginger Favours Comparator

≤1g/day for any duration
significantly reduced
odds of overall vomiting
incidence by 30%.
GRADE level: low

	Ging	er	Compa	rator		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Fahimi 2011	26	36	28	36	0.0%	0.74 [0.25, 2.17]	
Konmun 2017	9	40	28	41	32.4%	0.13 [0.05, 0.36]	←
Li 2018	11	71	15	69	19.4%	0.66 [0.28, 1.56]	•
Manusirivithaya 2004	27	43	25	43	14.0%	1.22 [0.51, 2.89]	- •
Panahi 2012	12	37	12	41	11.6%	1.16 [0.44, 3.04]	- •
Thamlikitkul 2017	9	34	10	34	11.1%	0.86 [0.30, 2.50]	•
Yekta 2012	2	40	8	40	11.5%	0.21 [0.04, 1.06]	+-
Zick 2009	19	53	12	57	0.0%	2.10 [0.90, 4.90]	
Zick 2009b	15	53	12	57	0.0%	1.48 [0.62, 3.54]	
Total (95% CI)		265		268	100.0%	0.60 [0.40, 0.88]	-
Total events Heterogeneity. Chi² = 1 Test for overall effect: 2	•			; I ² = 63	7%		0.2 0.5 1 2 5 Favours Ginger Favours Comparator

Any dose for >3-days duration significantly reduced odds of overall nausea by 40%.

GRADE level: low



Limitations

- Clinical heterogeneity
- Missing Data
- Small sample size in some studies
- Limited confidence in estimated effect



Take Home Message

Ginger supplementation for >3-days may improve CINV. Existing research around dosage remains inconsistent.

...more research!



