Depression with Functional GI disorder

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1. Life style factors, FGID and depression
2. Definition and Nutritional Tx of FGID
3. Nutrition and depression
4. Antidepressant for FGID
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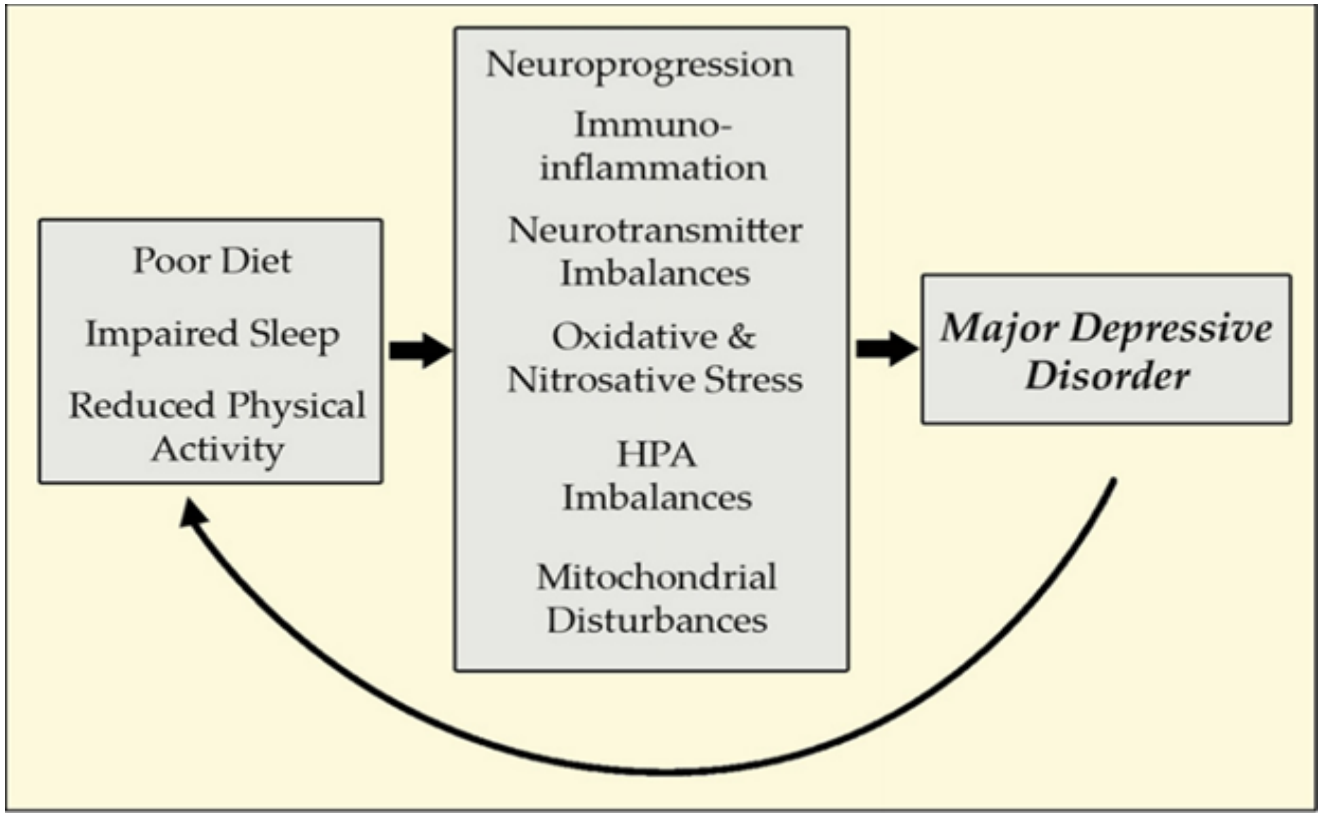
Lifestyle factors associated with major depression

Journal of Affective Disorders 148 (2013) 12–27



Potential mechanisms of diet, sleep and exercise on major depression.

Definition of FGID

Upper GI:

Low GI: IBS like symptoms

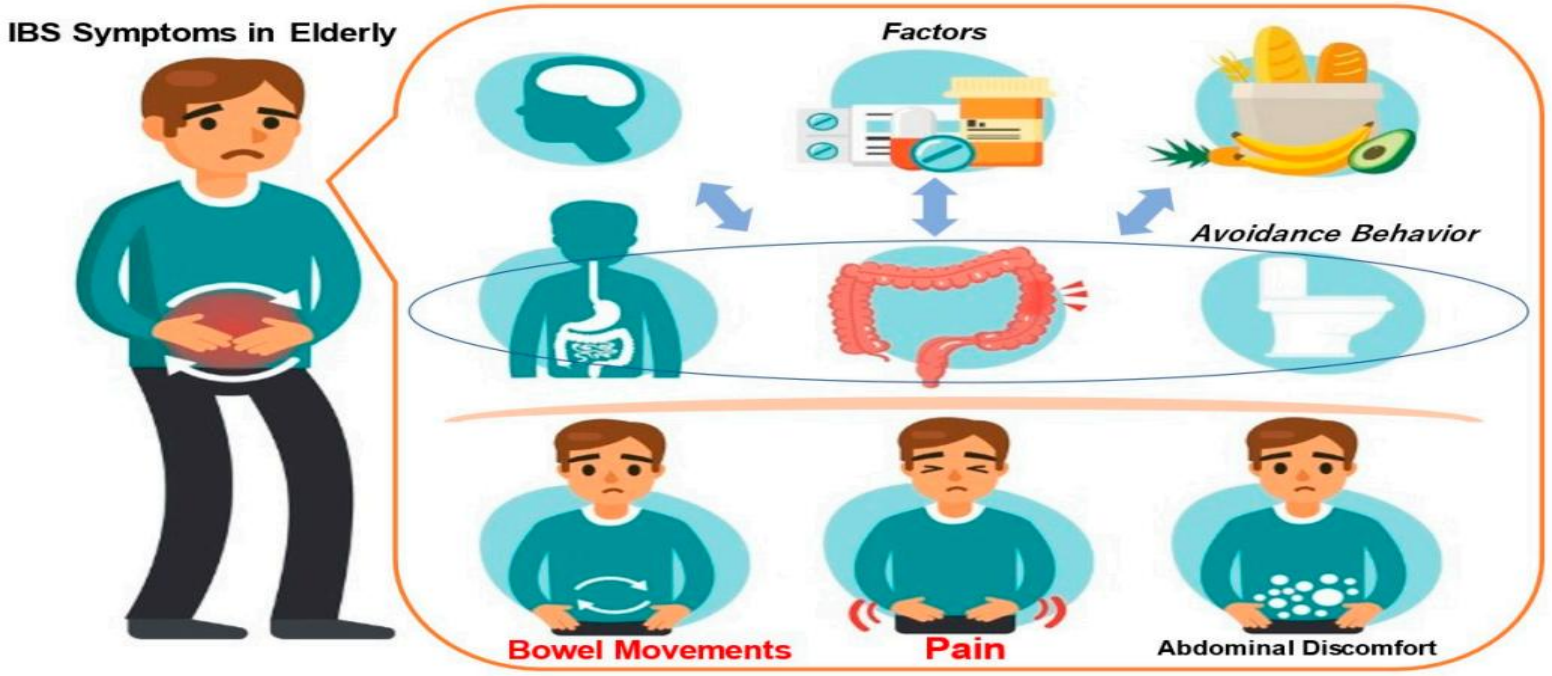
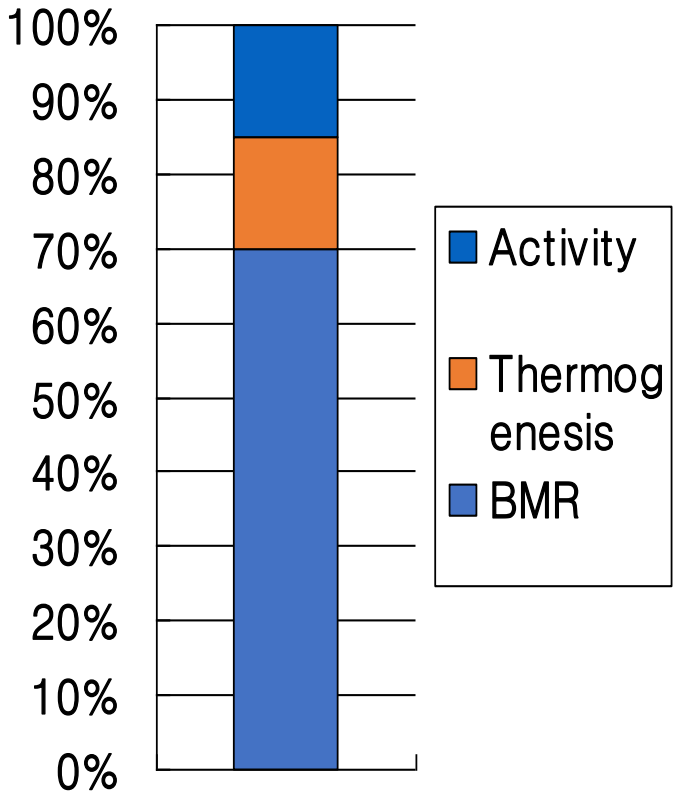


Figure 1. Mechanism of IBS manifestation in elderly individuals.

Why do we eat?

***소비에너지의 구성* vs 에너지영양소 필요량**



2020 한국인 평균 에너지 섭취량(kcal/일) 및 에너지 필요 추정량

연령(세)	평균 에너지 섭취량(kcal/일)		에너지 필요 추정량(kcal/일)	
	남자	여자	남자	여자
1-2	1,133.3		900	
3-5	1,435.0		1,400	
6-8	1,798.2	1,551.3	1,700	1,500
9-11	2,094.2	1,871.0	2,000	1,800
12-14	2,438.6	1,858.2	2,500	2,000
15-18	2,559.8	1,823.2	2,700	2,000
19-29	2,398.6	1,794.6	2,600	2,000
30-49	2,478.7	1,749.7	2,500	1,900
50-64	2,325.5	1,696.5	2,200	1,700
65-74	2,029.5	1,609.7	2,000	1,600
75 이상	1,808.9	1,305.4	1,900	1,500

Nutritional therapy for FGID

Healthcare **2023**, *11*, 2829

Eating meals is the best nutritional management

- Nutritional therapy Ix
  Energy expenditure or the ability to consume less than 60% of the necessary amount are expected to continue for more than a week.

✓ digestion, absorption, the function of immune system
✓ In-hospital mortality is significantly higher among hospitalized patients aged over 65 years who ingest less than half of their calorie needs

Nutritional Medicine as mainstream in psychiatry

Lancet Psychiatry 2015;
2: 271–74

Dietary counselling was as effective as psychotherapy at prevention of transition to case-level depression, especially in older adults

- A traditional whole-food diet

✓ Slight improvements in dietary intakes of sugar and fats
✓ High intakes of foods such as
vegetables, fruits, seafood, whole grains, lean meat, nuts and lugumes
✓ Avoidance of processed foods
✓ Intakes of several brain-essential nutrients, including B-group vitamins, zinc, and magnesium

Nutritional Medicine as mainstream in psychiatry

Lancet Psychiatry 2015;
2: 271–74

- The undelying mechanisms for this association

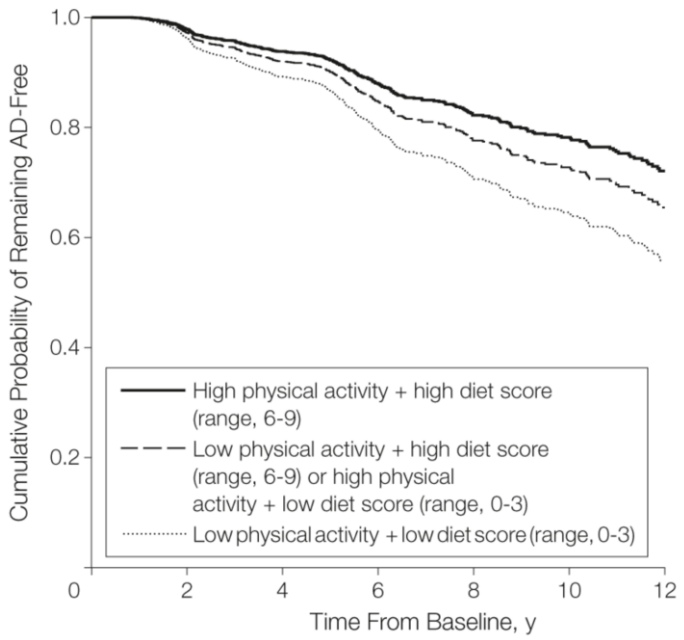
✓ Brain with a very high metabolic rate
total energy and nutrients intake in both structure and function
amino acid, fats, vitamins and minerals or trace elements
✓ Diet modulate the functioning of the immune system associated with the risk for depression
✓ Antioxidant defence system
✓ Neurotrophic factors for neuronal plasticity and repair mechanisms

Depression and energy intake-expenditure balance

Table 2. Odds ratios and 95% confidence intervals of depressive mood according to energy intake-expenditure balance

Variable	Energy intake-expenditure balance (kcal/d)				P for trend
	1st quartile (0%–25%)	2nd quartile (25%–50%)	3rd quartile (50%–75%)	4th quartile (75%–100%)	
Female					
No. of participants	1,950	1,950	1,950	1,950	
No. of PHQ-9 ≥5	473	414	380	408	
Model 1	1 (Ref)	0.84 (0.72–0.98)*	0.76 (0.65–0.88)*	0.83 (0.71–0.96)*	0.005
Model 2	1 (Ref)	0.85 (0.73–0.99)*	0.76 (0.66–0.89)*	0.82 (0.71–0.96)*	0.004
Model 3	1 (Ref)	0.86 (0.74–1.00)	0.78 (0.67–0.91)*	0.85 (0.73–1.00)	0.025
Model 4	1 (Ref)	0.87 (0.75–1.02)	0.79 (0.67–0.92)*	0.86 (0.74–1.01)	0.030

Korean J Fam Med. 2023 Nov;44(6):319-326. doi: 10.4082/kjfm.22.0165.



JAMA. 2009;302(6):627-637. doi:10.1001/jama.2009.1144

적절한 에너지 공급 이 지속되지 않으면

- 피로감 증가
- Mood change
- 기억력, 집중력 저하

운동은 (…..)가 필요한 약이다.

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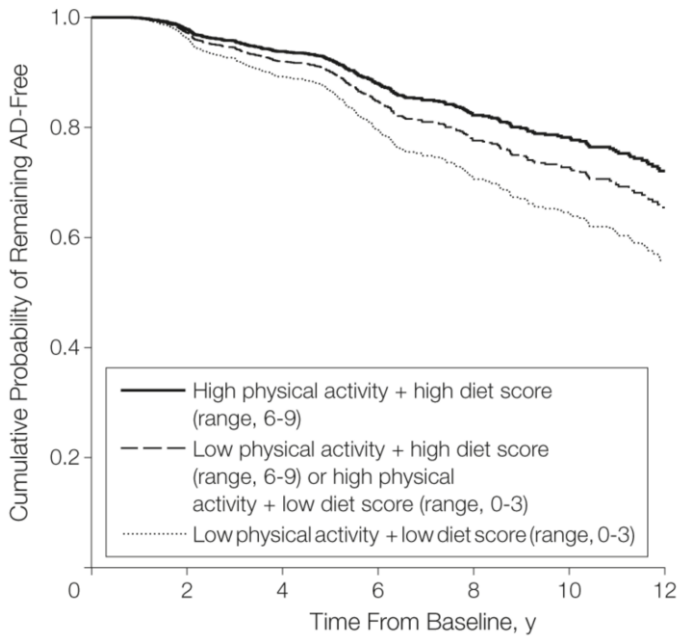

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Association between suicidal ideation according to SSB consumption

	SSB consumption (cups/week)				*P* for trend
	Non-drinker (n = 1,644)	≤ 2/week (n = 2,520)	3–6/week (n = 956)	≥ 1/day (n = 345)	
No. of suicidal ideation	58	110	39	21	
Model 1	1	1.44 (0.99–2.10)	1.45 (0.91–2.31)	1.75 (0.99–3.12)	0.143
Model 2	1	1.45 (0.98–2.13)	1.54 (0.91–2.59)	1.95 (0.99–3.82)	0.013
Model 3	1	1.61 (1.09–2.36)*	1.61 (0.94–2.76)	2.13 (1.09–4.16)*	< 0.001
Model 4	1	1.63 (1.11–2.41)*	1.66 (0.96–2.87)	2.20 (1.13–4.28)*	< 0.001

Statistical differences were tested using logistic regression analysis using following 4 models:
1) Not adjusted (Model 1), 2) Adjusted for age, sex (Model 2), 3) Model 2 with additional adjustment for BMI, smoking, alcohol, physical activity, marital status, household income, employment status, education level, living status (Model 3) 4) Model 3 with additional adjustment for consumption frequencies of green tea, coffee, total energy intake (Model 4).
OR, odds ratio; CI, confidence interval; SSB, sugar-sweetened beverage.
*$P < 0.05$.

Nutr Res Pract. 2022 Apr;16(2):194-204

Physical activity and Mental health

- 양반응 관계?

Ref> JAMA Psychiatry. 2022 Jun; 79(6): 550–559.

Figure 1. Association Between Physical Activity and Incidence of Depression

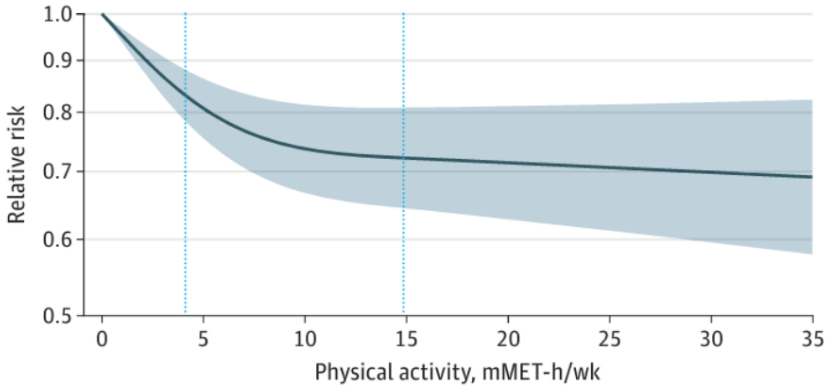


Figure 2. Associations Between Physical Activity and Incidence of Major Depression and Elevated Depressive Symptoms

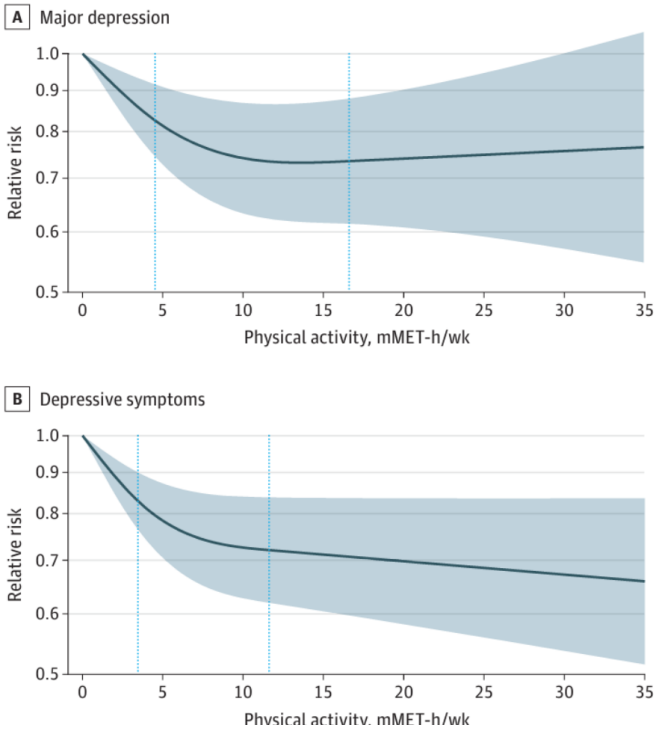
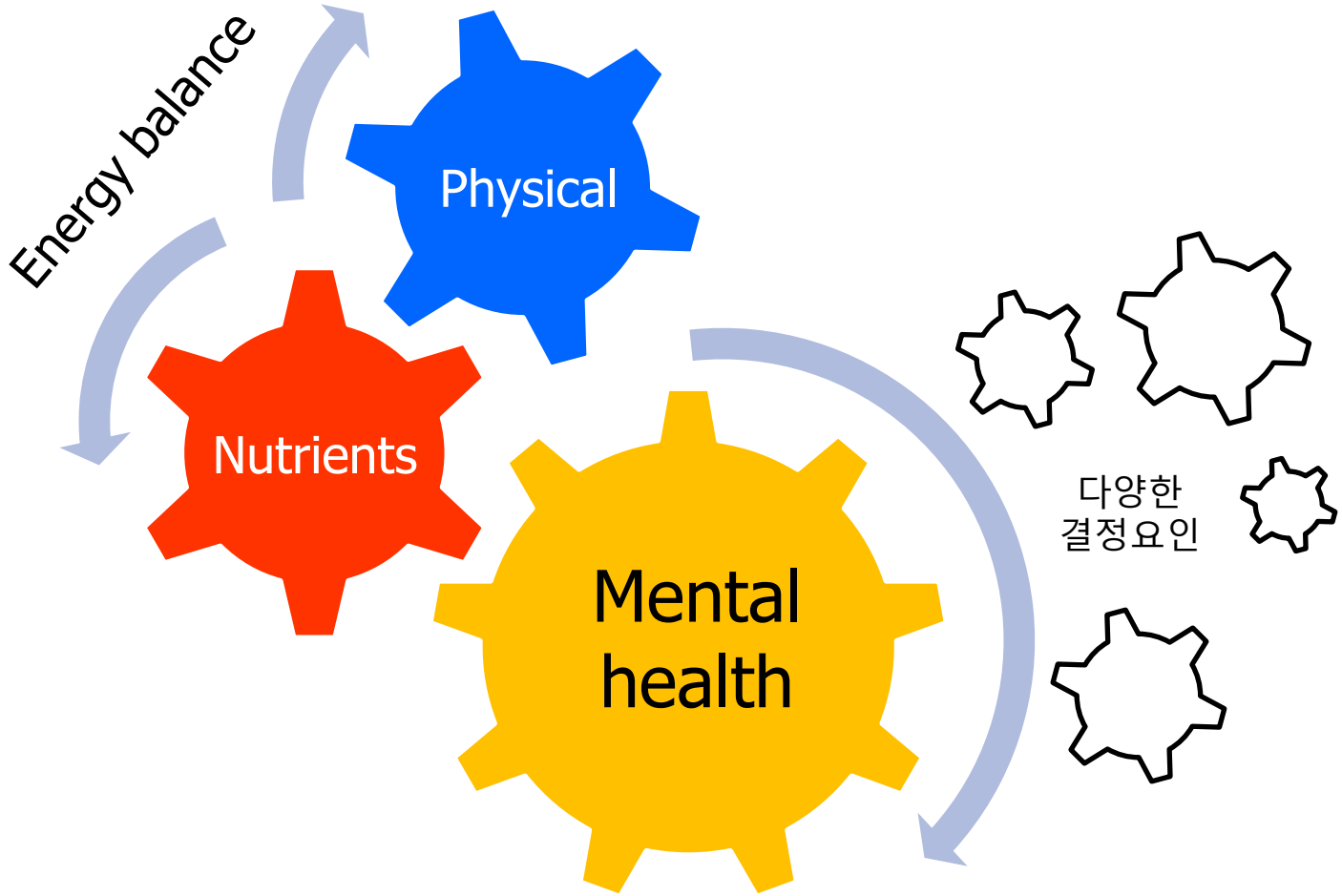


Table 2. Relative Risk and Potential Impact Fractions of Incident Depression, Major Depression, and Elevated Depressive Symptoms at 3 Physical Activity Levels[a]

	Risk association by activity volume [mMET-h/wk], RR (95% CI)			Population impact by activity volume [mMET-h/wk], PIF (95% CI), %		
	4.4	8.8	17.5	4.4	8.8	17.5
Depression	0.82 (0.77-0.87)	0.75 (0.68-0.82)	0.72 (0.64-0.81)	6.38 (4.25-8.63)	11.53 (7.69-15.43)	13.89 (8.44-19.25)
Major depression	0.83 (0.75-0.92)	0.75 (0.64-0.87)	0.74 (0.61-0.88)	2.97 (1.27-4.91)	7.28 (3.36-11.44)	8.04 (2.38-13.82)
Elevated depressive symptoms	0.80 (0.73-0.88)	0.73 (0.64-0.84)	0.70 (0.59-0.84)	9.45 (5.19-13.86)	14.44 (7.88-20.92)	17.01 (8.39-25.24)

Physical activity, Nutrients and Mental health



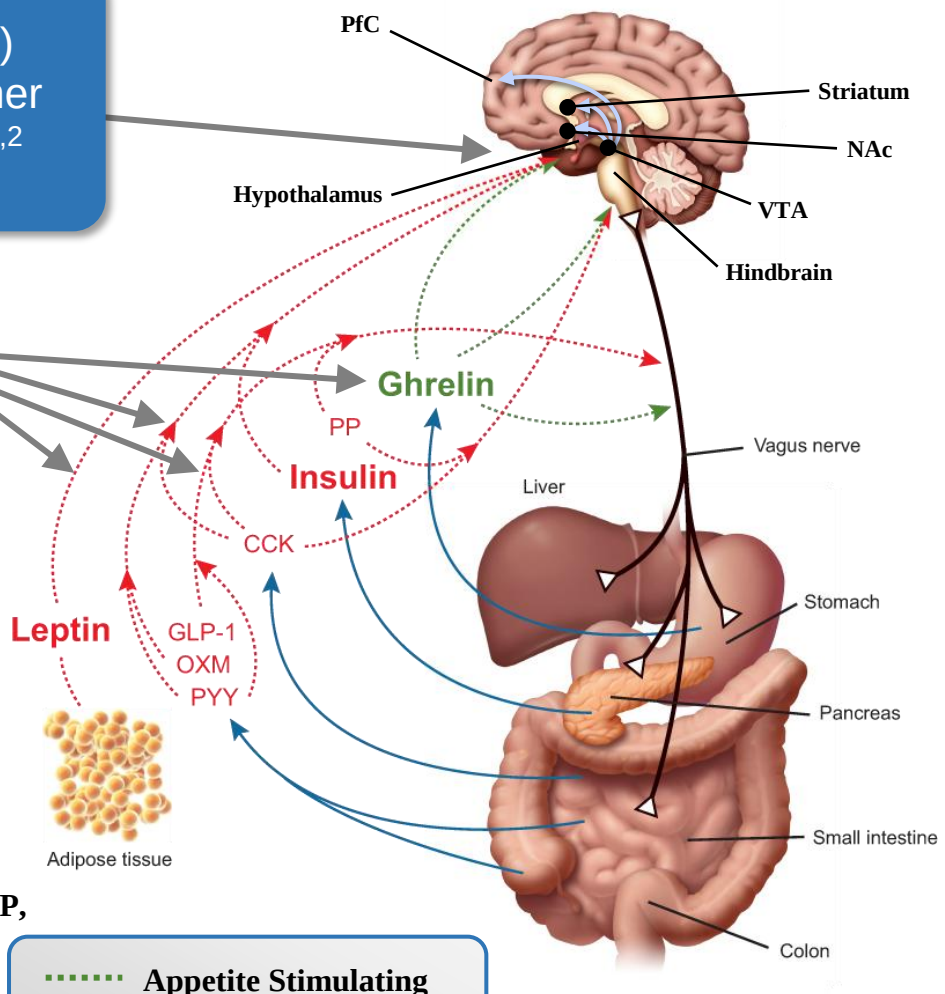
Complex Peripheral Signals Are Integrated Into CNS Systems to Regulate Body Weight and Eating

Brain systems (homeostatic and reward) receive and integrate peripheral and other CNS signals (eg, dopamine, serotonin)[1,2]

Peripheral signals are released by pancreas, gastrointestinal system, and adipose tissue[1,2]

Peripheral signals are relayed to brain systems via the blood and vagus nerve[1,2]

- Leptin, insulin, and ghrelin are integrated directly into the hypothalamus



CNS, central nervous system; PfC, prefrontal cortex; NAc, nucleus accumbens; VTA, ventral tegmental area; PP, pancreatic polypeptide; CCK, cholecystokinin; GLP-1, glucagon-like peptide 1; OXM, oxyntomodulin; PYY, peptide YY.

Primarily based on data from animal studies.

Adapted with permission from Mendieta-Zerón H et al.[2]

1. **Yu JH et al. *Diabetes Metab J*. 2012;36(6):391-398.**
2. **Mendieta-Zerón H et al. *Gen Comp Endocrinol.* 2008;155:481-495.**

Summary of nutrients and diet patterns associated with more or less anxiety symptom severity and disorder prevalence

Association with Less Anxiety	Association with More Anxiety
• Vegetables and Fruit • Omega-3 Fatty Acids, Alpha-lipoic acid, Omega-9 Fatty acids • Nuts and seeds • "Healthy" Dietary Patterns, Mediterranean diet, Traditional Dietary Patterns, Anti-inflammatory diet pattern • Caloric Restriction • Fasting or intermittent fasting • Breakfast Consumption • Broad-Spectrum Micronutrients • Vegan Diet • Zinc, Magnesium, Selenium • Vitamin C, Vitamin E, Choline • Ketogenic Diet • Food sources of *Lactobacillus* and *Bifidobacterium* • Culinary herbs, Turmeric, Saffron, Soy, Green tea, Herbal tea, Quercetin, Resveratrol, other phytochemicals (flavonoids, polyphenols, carotenoids)	• High-fat diet, high cholesterol, high trans fat • Inadequate tryptophan and dietary protein • High intake of sugar and refined carbohydrates, artificial sweeteners • "Unhealthy" Dietary Patterns, typically defined as high in unhealthy fats and refined sugars • Snacking

Summary of Gut-Brain Neuromodulators

Drug class, drug	Mode of action	Actions on GI sensorimotor function	Relevance to symptom control	Side effects
TCA				
Amitriptyline, imipramine, desipramine, nortriptyline	Presynaptic SRI and NRI. Antagonism/inhibition of multiple post-synaptic (5-HT_2, 5-HT_3, H1, muscarinic-1, α1) and presynaptic (α2) receptors.	Motility: slow GI transit, largely related to their anticholinergic and noradrenergic properties Sensitivity: limited and inconsistent evidence that TCAs decrease visceral sensitivity	Pain reduction. Best documented for IBS, but also FD (EPS). Potential usefulness in all FGIDs where pain is a prominent feature. Side effect profile can be useful in order to reduce diarrhea and improve sleep.	Drowsiness, dry mouth, constipation, sexual dysfunction, arrhythmias, and weight gain
SSRI				
Citalopram, escitalopram, fluoxetine, paroxetine, sertraline	Presynaptic SRI.	Motility: enhancement of gastric and small bowel propulsive motility Sensitivity: no major impact on visceral sensitivity in healthy subjects or patients with FGIDs	Treatment of associated anxiety, phobic features, and OCD in FGIDs.	Agitation, diarrhea, insomnia, night sweats, headache, weight loss, and sexual dysfunction.
SNRI				
Duloxetine, milnacipran, venlafaxine	Pre-synaptic SRI and NRI. Equally strong for duloxetine. NRI for venlafaxine in higher doses. Milnacipran stronger NRI than SRI effects.	Motility: inhibitory effect on gastric and colonic tone, but not to the degree of TCAs; more studies are needed Sensitivity: few studies available; area requiring further research	Treatment of associated pain (based on efficacy in fibromyalgia, back pain, and headache) in FGIDs. Potential use for painful FGIDs; however, formal evidence in treatment of specific FGID-related pain is lacking.	Nausea, agitation, dizziness, sleep disturbance, fatigue, and liver dysfunction

Gastroenterology 2018;154:1140–1171

Summary of Gut-Brain Neuromodulators

Drug class, drug	Mode of action	Actions on GI sensorimotor function	Relevance to symptom control	Side effects
			pain is lacking.	
NA and specific serotonergic antidepressants				
Mirtazapine, mianserin, trazodone	Indirect effects resulting in increased NA and serotonergic activity through $\alpha 2$ antagonism on NA and 5-HT neurons. Also 5-HT_2, 5-HT_3, H1, muscarinic-1 antagonism	Motility: lack of detailed studies Sensitivity: lack of detailed studies	Potential use for treatment of early satiation, weight loss, and chronic nausea/vomiting. Side effect profile can be useful to improve sleep.	Sedation, headache, dry mouth, and weight gain
Azapirones				
Buspirone, tandospirone	Partial pre- and post-synaptic 5-HT_1 agonists	Motility: enhanced esophageal contractions and increased gastric accommodation in health and FD Sensitivity: limited data suggest no effect	Treatment of associated anxiety. Potential use for treatment of early satiety, fullness, and nausea, but consistent evidence in FGIDs is lacking.	Sedation, headache, and vertigo

Gastroenterology 2018;154:1140–1171

예>

Take Home Message

1. Depression, FGID, IBS 에 공통적으로 관여하는 생활습관 요인 교정
   Energy intake and expenditure balance
   Diet quality
   Regular eating
   Food recommended and avoid

2. Pharmacological Tx with antidepressant and GI drugs
3. Other Life style modification: Exercise, Smoking and Drinking alcohol

Thank you for your attention