**Supplementary Material:**

**Interferon-γ** **Moderation of Poor Sleep Maintenance and Depressed Mood in Community-Dwelling Older Adults**

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**Table S1.** Characteristics of subjects who did and did not participate in the sleep laboratory component

|  |  |  |
| --- | --- | --- |
|  | Subjects who **did** participate in the sleep laboratory component(*n* = 40) | Subjects who **did not** participate in the sleep laboratory component(*n* = 222) |
|  | % | Mean (SD) | % | Mean (SD) |
| **Socio-demographic variables** |  |  |  |  |
| Age, years |  | 71.7 (6.7) |  | 71.9 (8.1) |
| Sex, female | 57.5 |  | 49.5 |  |
| Race |  |  |  |  |
|  American Indian/Alaskan Native | - |  | - |  |
|  Asian | 2.5 |  | 1.4 |  |
|  Black/African American | 10.0 |  | 7.7 |  |
|  Native Hawaiian/Pacific Islander  | - |  | 0.9 |  |
|  White | 85.0 |  | 87.7 |  |
|  Other/Multiracial | 2.5 |  | 2.3 |  |
| Ethnicity |  |  |  |  |
|  Hispanic/Latino | 10.0 |  | 4.1 |  |
|  Non-Hispanic/Non-Latino | 90.0 |  | 95.9 |  |
| Education, years |  | 16.5 (2.8) |  | 16.4 (2.8) |
| **Clinical variables** |  |  |  |  |
| Body mass index, kg/m2 |  | 26.3 (4.3) |  | 26.3 (4.1) |
| Chronic disease score |  | 1.3 (1.3) |  | 2.0 (2.2) |
| **Physical activity** |  |  |  |  |
| YPAS summary score |  | 60.6 (30.4) |  | 60.2 (29.9) |

There were no statistical differences in socio-demographic variables, clinical characteristics or levels of physical activity between subjects who did and did not participate in the sleep laboratory component (Welch’s *t*-test was used for continuous variables; χ2 test was used for categorical variables). Abbreviations: YPAS = Yale Physical Activity Survey for Older Adults; SD = standard deviation.

**Table S2.** Correlations between WASO and immune markers (*n* = 36)

|  |  |
| --- | --- |
|   | WASOln, min |
| IFN-γln, pg/mL | 0.35\* |
| TNF-αln, pg/mL | 0.04 |
| IL-6ln, pg/mL | 0.02 |
| IL-8ln, pg/mL | -0.14 |
| IL-10ln, pg/mL | 0.20 |

Shown are partial correlations between WASO and immune markers, while controlling for age, sex and BMI.

\**p* < 0.05

Abbreviations: WASO = wake time after sleep onset; IFN = interferon; TNF = tumor necrosis factor; IL = interleukin; BMI = body mass index.

**Table S3.** Associations between WASO and depressed mood (*n* = 36)

|  |  |
| --- | --- |
|  | β |
| Model 1: unadjusted (WASO1 only) | 0.43\* |
| Model 2: Model 1 + socio-demographic factors2 (sex, age, race/ethnicity, and education) | 0.42\* |
| Model 3: Model 2 + clinical factors2 (BMI and CDS) | 0.43\* |
| Model 4: Model 3 + physical activity2 (YPAS summary score) | 0.43\* |

1assessed during the evaluation night of PSG

2assessed at baseline visit

Depressed mood as assessed by POMS-D was evaluated at 8:00 a.m., 2:00 p.m., and 10:00 p.m. following the evaluation night of PSG (POMS-D scores were averaged across the 3 time points).

\**p* < 0.05

Abbreviations: WASO = wake time after sleep onset; BMI = body mass index; CDS = Chronic Disease Score; YPAS = Yale Physical Activity Survey for Older Adults; PSG = polysomnography; POMS-D = Profile of Mood States – Depression Subscale.

**Table S4.** Associations between IFN-γ and depressed mood (*n* = 36)

|  |  |
| --- | --- |
|  | β |
| Model 1: unadjusted (IFN-γ1 only) | 0.47\*\* |
| Model 2: Model 1 + socio-demographic factors2 (sex, age, race/ethnicity, and education) | 0.44\*\* |
| Model 3: Model 2 + clinical factors2 (BMI and CDS) | 0.46\*\* |
| Model 4: Model 3 + physical activity2 (YPAS summary score) | 0.47\*\* |

1assessed at 8:00 a.m. following the evaluation night of PSG

2assessed at baseline visit

Depressed mood as assessed by POMS-D was evaluated at 8:00 a.m., 2:00 p.m., and 10:00 p.m. following the evaluation night of PSG (POMS-D scores were averaged across the 3 time points)*.*

\*\**p* < 0.01

Abbreviations: IFN = interferon; BMI = body mass index; CDS = Chronic Disease Score; YPAS = Yale Physical Activity Survey for Older Adults; PSG = polysomnography; POMS-D = Profile of Mood States – Depression Subscale.

**Figure S1.** Moderation model



Shown is the hypothesized model of IFN-γ moderating the relationship between WASO and depressed mood. WASO was assessed during the evaluation night of PSG; IFN-γ was assessed at 8:00 a.m. following the night of PSG; depressed mood was assessed at 8:00 a.m., 2:00 p.m., and 10:00 p.m. following night of PSG (POMS-D scores for each individual were averaged across the 3 time points).

Abbreviations: WASO = wake time after sleep onset; IFN = interferon.

**Figure S2.** Mediation model



Shown is the exploratory model of IFN-γ mediating the relationship between WASO and depressed mood. WASO was assessed during the evaluation night of PSG; IFN-γ was assessed at 8:00 a.m. following the night of PSG; depressed mood was assessed at 8:00 a.m., 2:00 p.m., and 10:00 p.m. following night of PSG (POMS-D scores for each individual were averaged across the 3 time points). The *a*-path links WASO to IFN-γ; the *b*-path links IFN-γ to depressed mood; the *c’*-path links WASO to depressed mood, while controlling for IFN-γ (direct effect); the *c-*path links WASO to depressed mood, without controlling for IFN-γ (total effect); the *ab*-path links WASO to depressed mood through altering levels of IFN-γ (indirect effect or “mediation effect”).

Abbreviations: WASO = wake time after sleep onset; IFN = interferon.