Biological & Cognitive Markers of Dementia Caregiver Stress and the Impact of Caregiver Interventions

Andrew P Allen

Senior postdoctoral researcher,

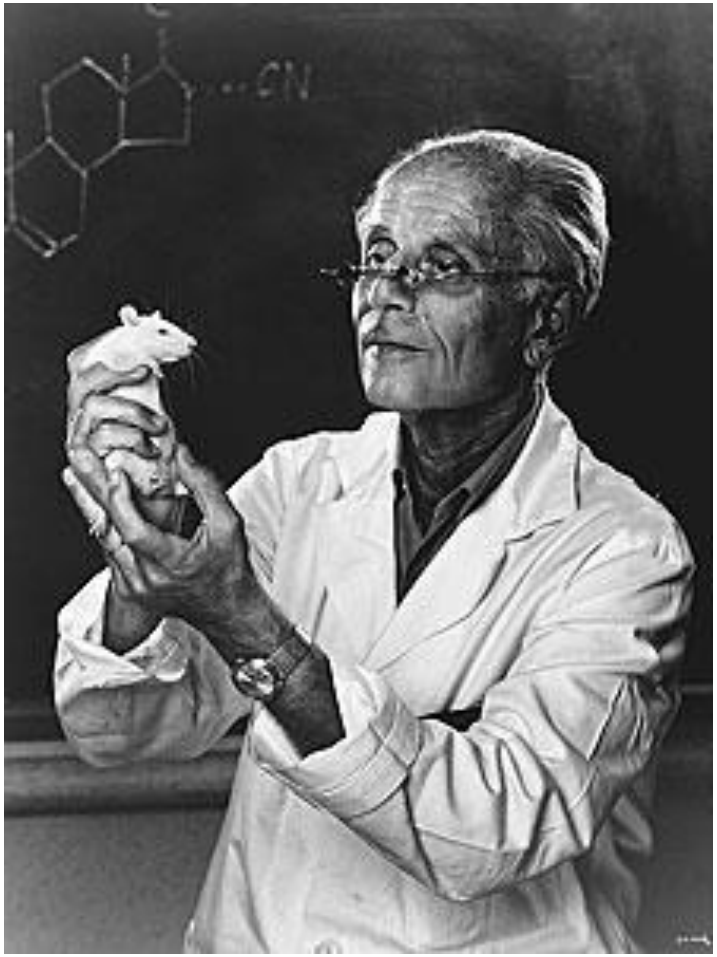
Dept. Psychiatry & Neurobehavioral Science
& APC Microbiome Institute

Stressors

Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

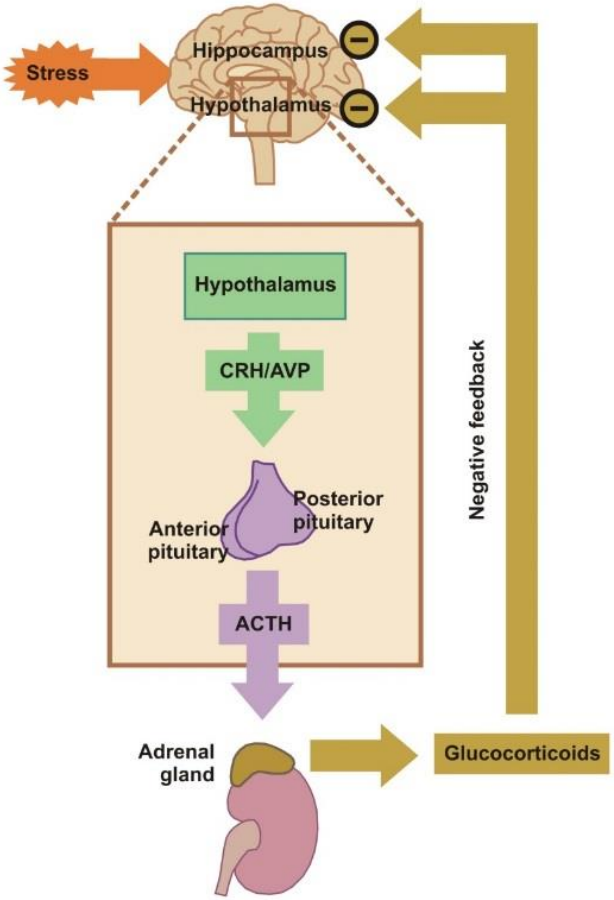
Stress reaction

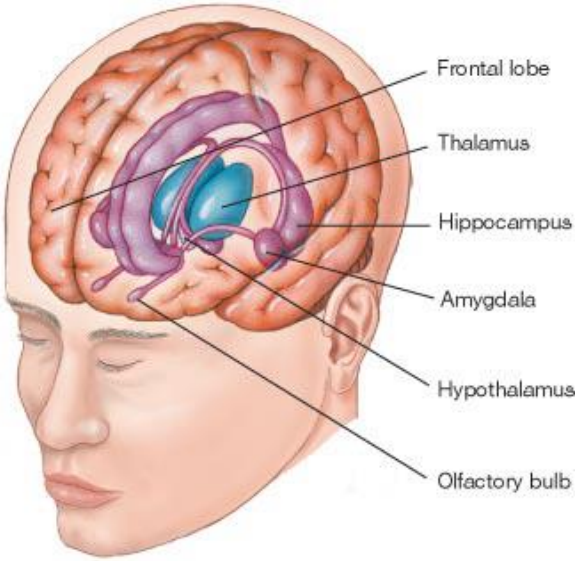
"It's not stress that kills us, it is our reaction to it".
Hans Selye

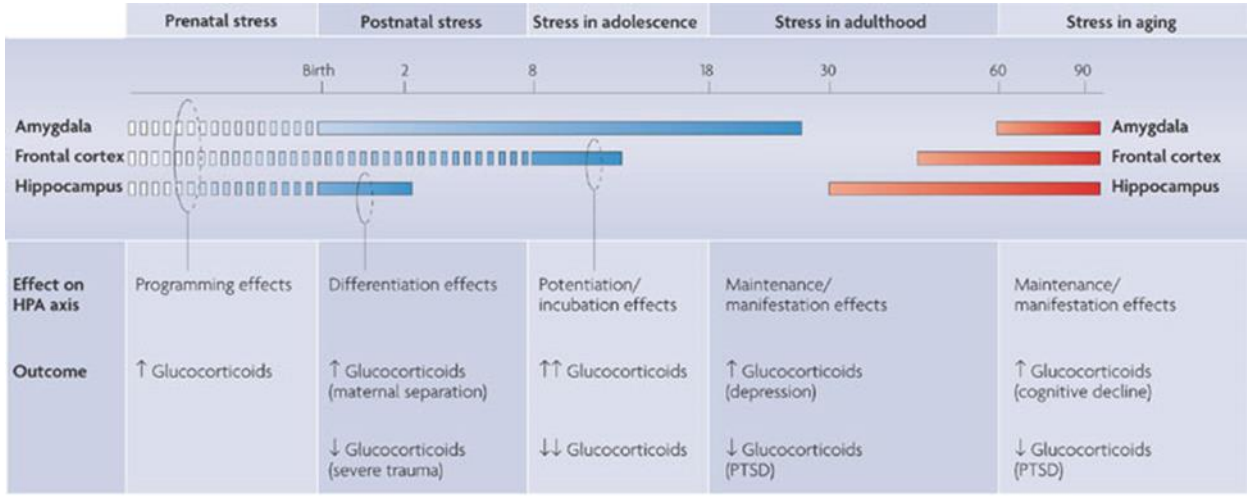


The Biology of Stress

Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie



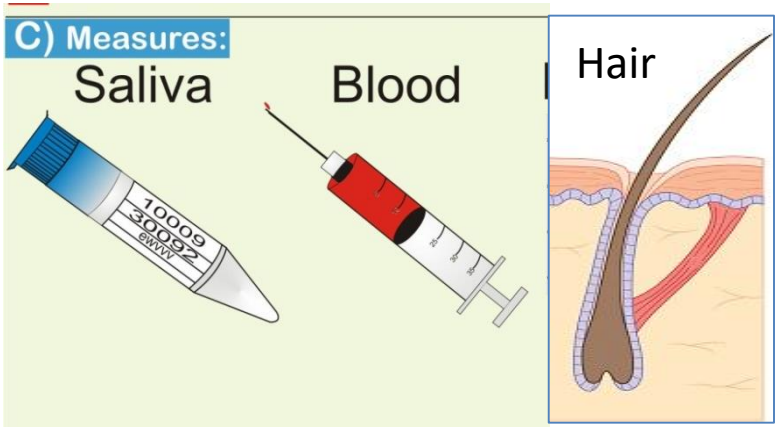


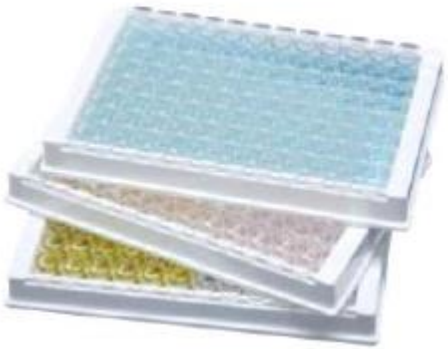


Nature Reviews | Neuroscience

Measuring Stress

Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie





Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Name _____ Date _____

Age _____ Gender (*Circle*): **M F** Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

	1	2	3	4	5	6	7	8	9	10	11	12
A	Blk	S1	S1	1	1	1	9	9	9	17	17	17
B	Blk	S2	S2	2	2	2	10	10	10	18	18	18
C	NSB	S3	S3	3	3	3	11	11	11	19	19	19
D	NSB	S4	S4	4	4	4	12	12	12	20	20	20
E	B_0	S5	S5	5	5	5	13	13	13	21	21	21
F	B_0	S6	S6	6	6	6	14	14	14	22	22	22
G	B_0	S7	S7	7	7	7	15	15	15	23	23	23
H	TA	S8	S8	8	8	8	16	16	16	24	24	24

Blk - Blank
TA - Total Activity
NSB - Non-Specific Binding
B_0 - Maximum Binding
S1-S8 - Standards 1-8
1-24 - Samples

Informal dementia care

Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

Article

Risk of Cognitive and Functional Impairment in Spouses of People With Dementia: Evidence From the Health and Retirement Study

Journal of Geriatric Psychiatry and Neurology
2015, Vol. 28(4) 260-271
© The Author(s) 2015
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0891988715588834
jgpn.sagepub.com
SAGE

Maria M. Pertl, PhD[1], Brian A. Lawlor, MD[2], Ian H. Robertson, PhD[1], Cathal Walsh, PhD[3], and Sabina Brennan, PhD[1]

Aims

1. Highlight impact of carer stress to inform public policy

2. Assess cognition and biological markers of stress in informal dementia caregivers

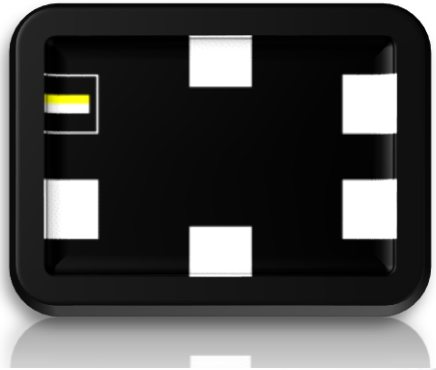
3. Assess impact of interventions to manage carer stress

Caregiver assessment: Participants

	Caregivers (N = 74)	Controls (N = 31)	P-value
Age	56.5 (SD = 11.9)	55.7 (SD = 10)	.75
Gender	F = 49, M = 23	F = 21, M = 10	.98
Relation to care recipient	Child = 47, Spouse = 25, Sibling = 1, Friend = 1		
Burden (ZBI; 22 item)	34.8 (SD = 16.5)		

Caregiver assessment: Methods

CANTAB



Flexible test battery assessing numerous cognitive domains

Validated in wide variety of clinical populations

Stress, depression & anxiety

Cohen perceived stress scale

Beck depression inventory

Spielberger trait anxiety inventory

Caregiver assessment: Methods

<u>Stress biomarkers</u>

Blood: pro-inflammatory cytokines

Salivary cortisol

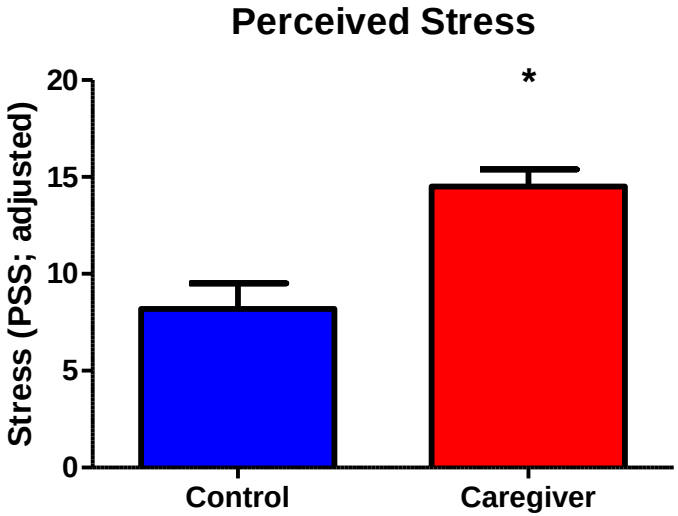
Stool

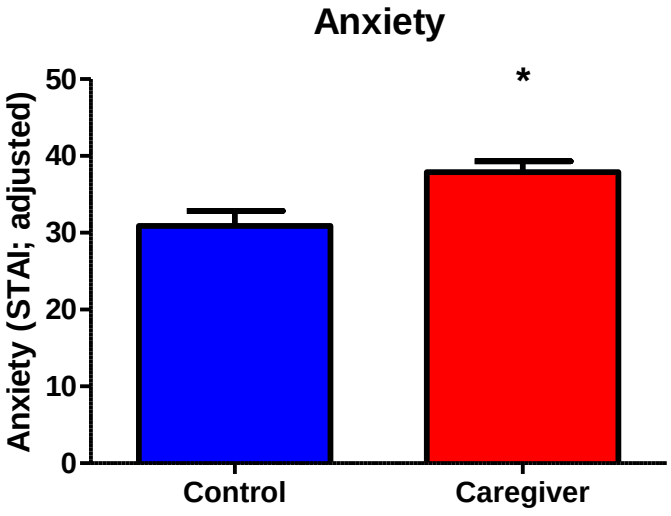
Urine

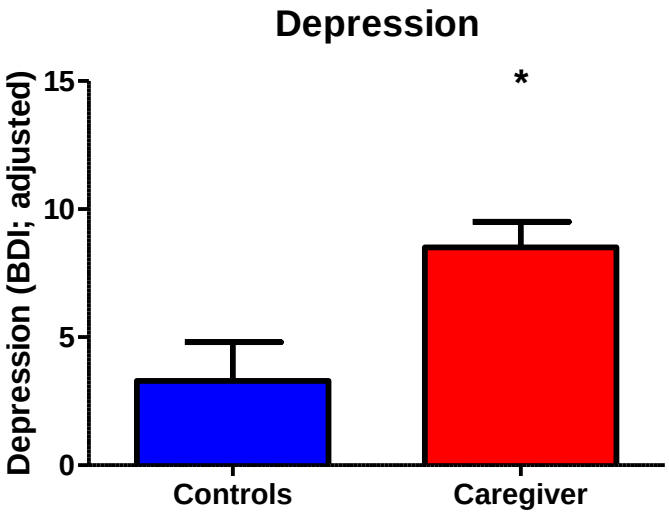
Hair

Higher Stress, Anxiety & Depression

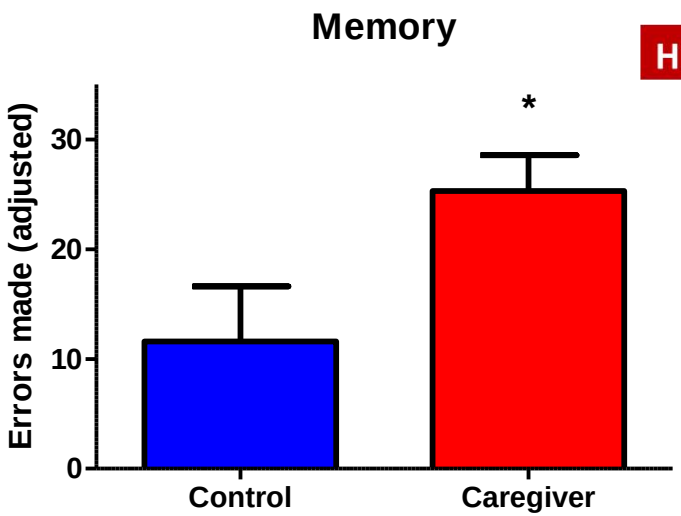
Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

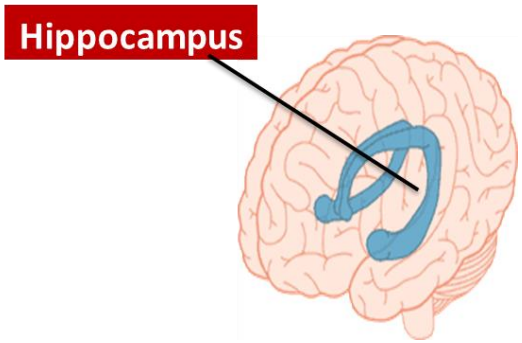




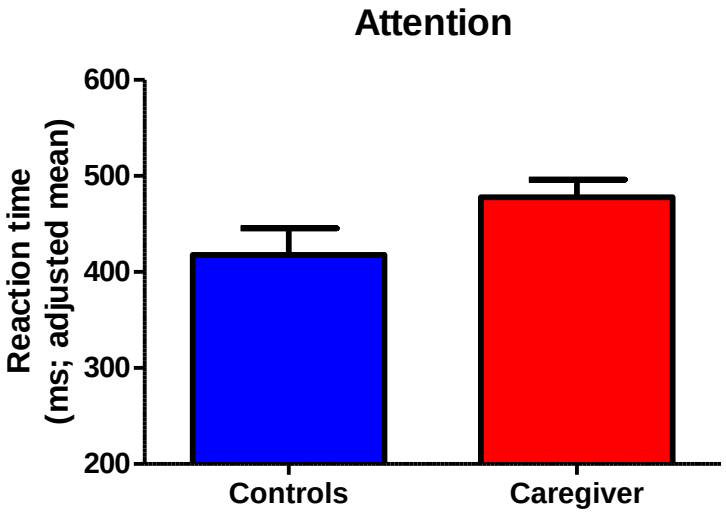


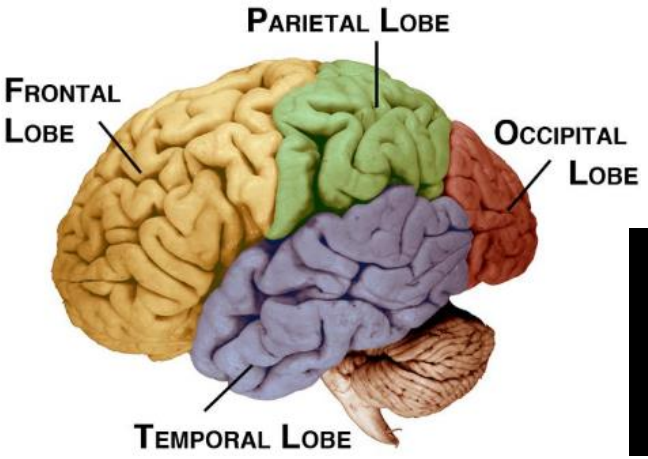
Cognitive performance

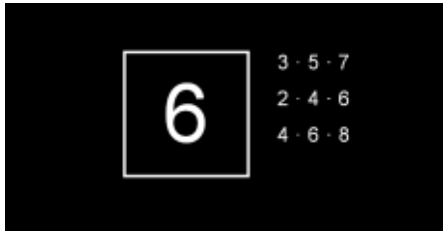




CANTAB



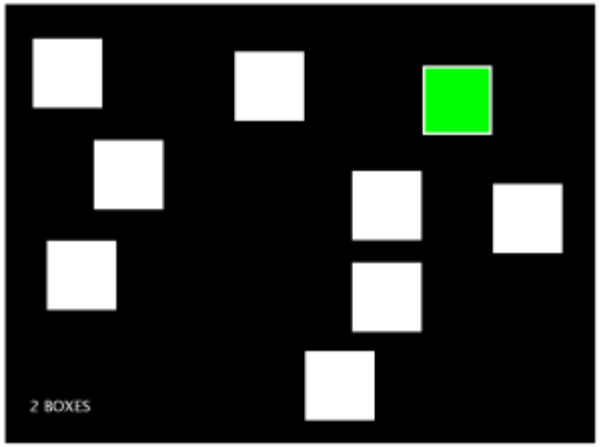


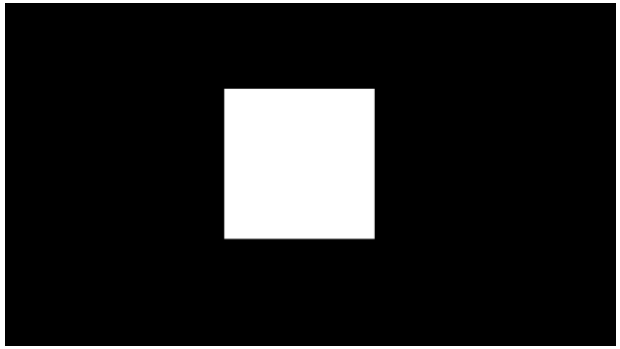


Cognitive performance

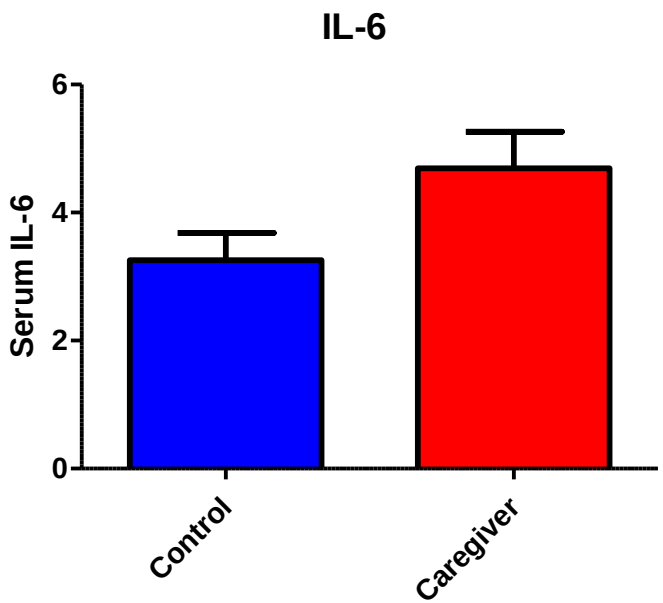
CANTAB

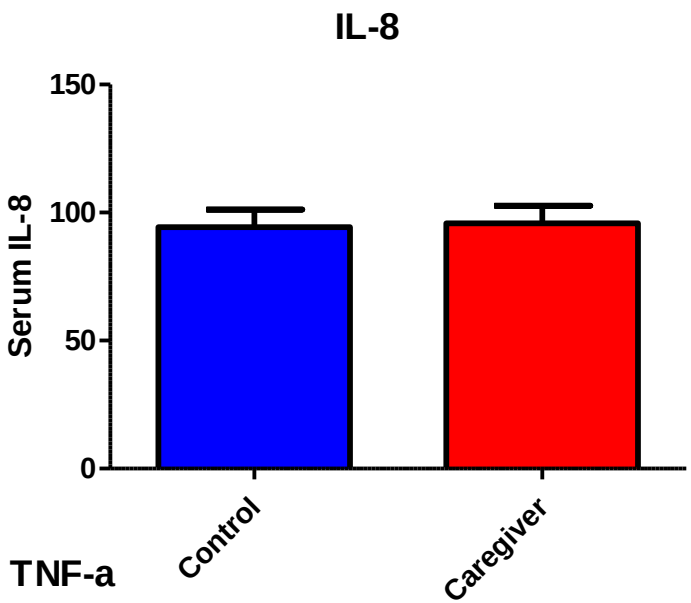
Other tests unaffected

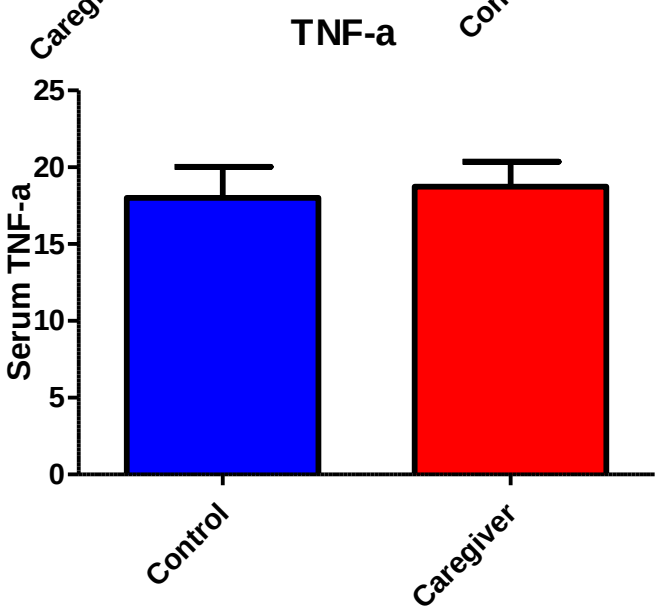




Higher Pro-inflammatory Cytokine







Positive Aspects of Caregiving

Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

THE LANCET

< Previous Article | Volume 386, No. 10001, p1340, 3 October 2015 | Next Article >

Correspondence

Burdensome aspects of care rather than caregiver burden

Desmond O'Neill

Published: 03 October 2015

Positive Aspects of Caregiving

Providing help to the care recipient has made me feel…

Question	Agree a little (%)	Agree a lot (%)
…more useful	34	26
…good about myself	32	26
…needed	32	30
…appreciated	32	20
…important	14	8
…strong and confident	18	18

Positive Aspects of Caregiving

Providing help to the care recipient has…

Question	Agree a little (%)	Agree a lot (%)
…enabled me to appreciate life more	28	52
…enabled me to develop a more positive attitude toward life	22	33
…strengthened my relationships with others	23	35

Carer Interventions

Two group-based interventions

Both offered to caregivers

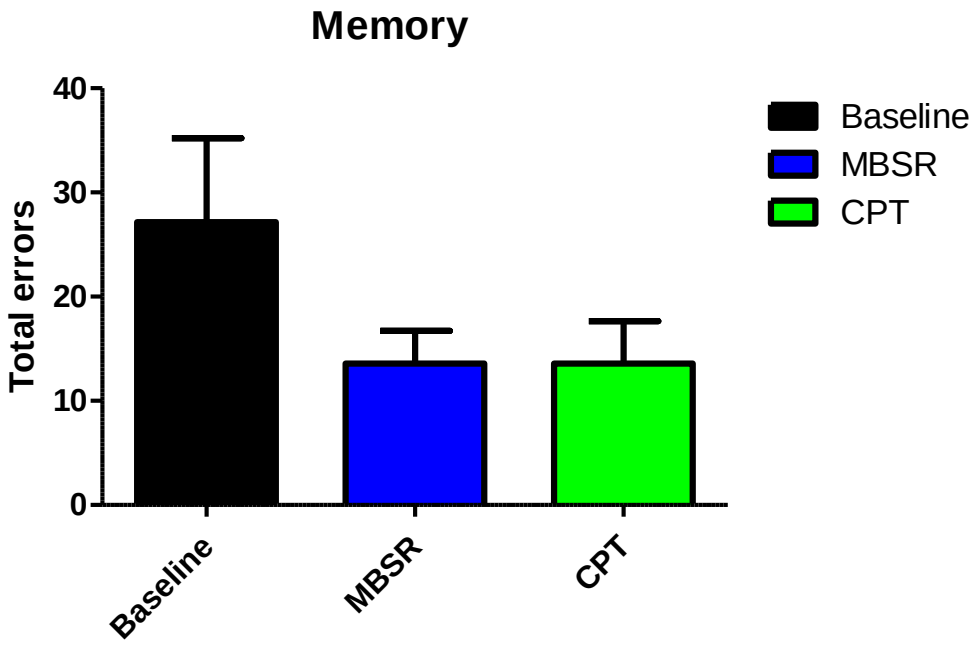
Approx. 2-month duration

Carer training program

Mindfulness-based stress reduction

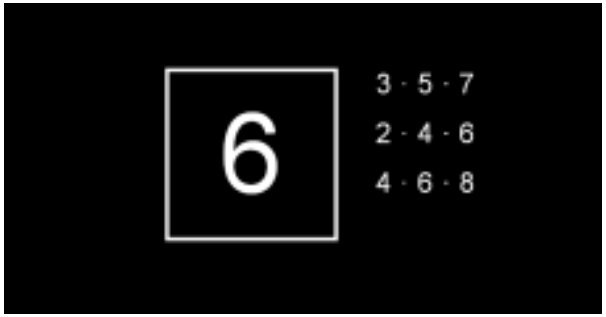
Carer Intervention Improves Performance

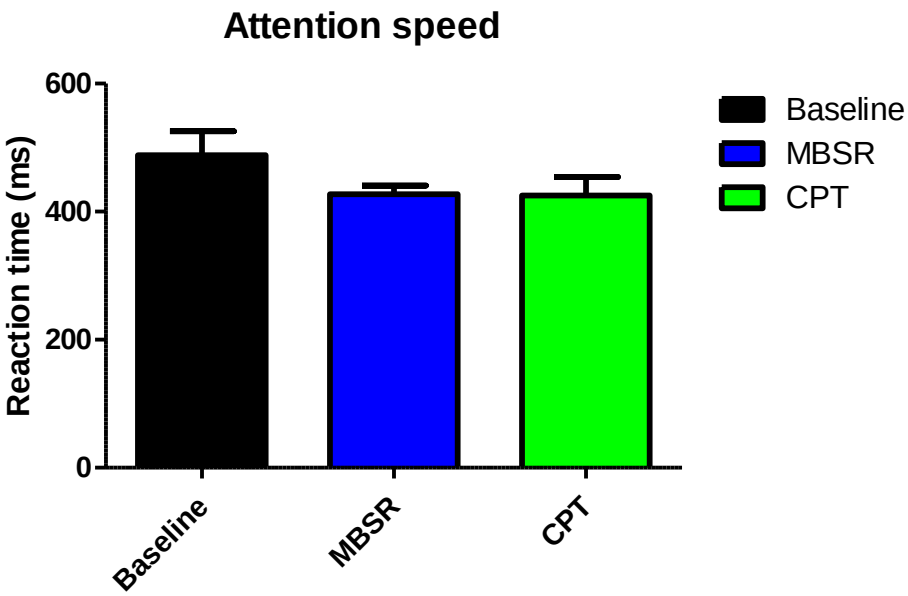
Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

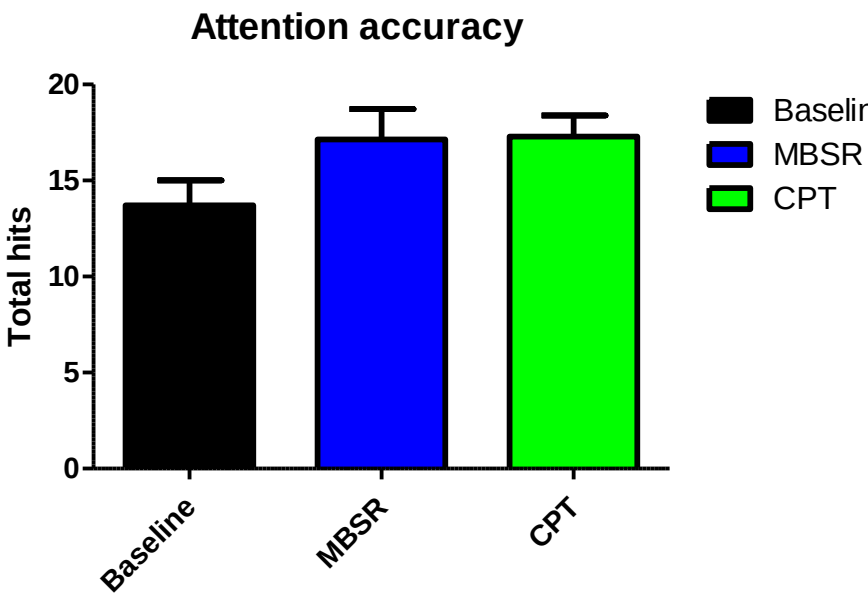


Carer Intervention Improves Performance

Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie







Summary

Caregiver assessment:

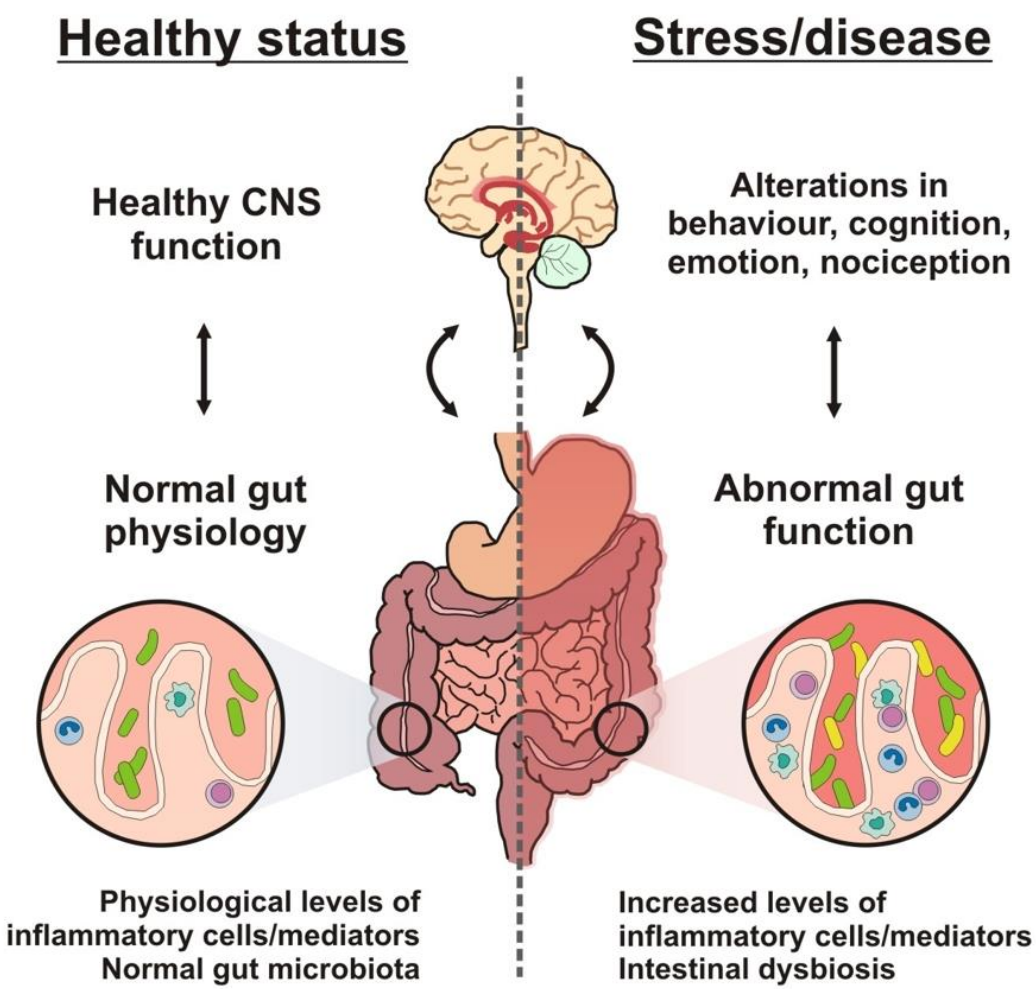
- Dementia caregiving impacts on cognitive performance
- Heightened stress, anxiety and depressive symptoms
- Heightened inflammatory cytokine

Stress management:

- Improved cognitive performance

Brain-Gut-Microbiome Axis

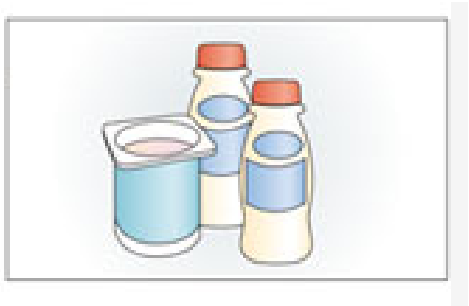
Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

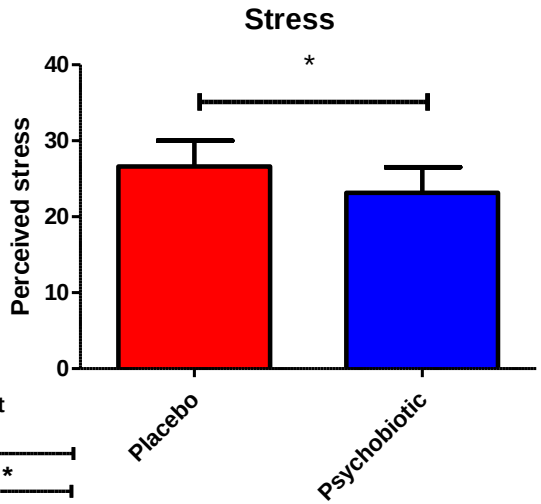


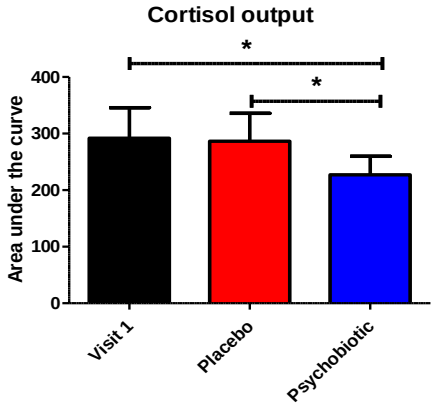
Grenham, Clarke et al., Frontiers in Physiology 2011

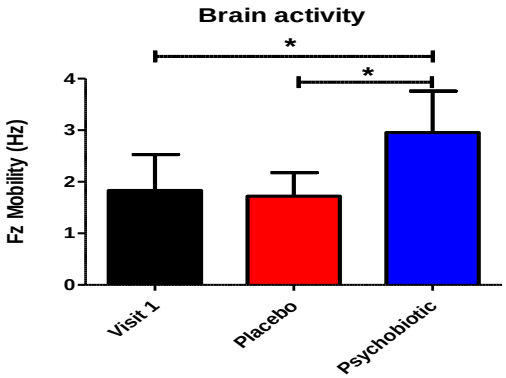
B. longum reduces stress in healthy human volunteers

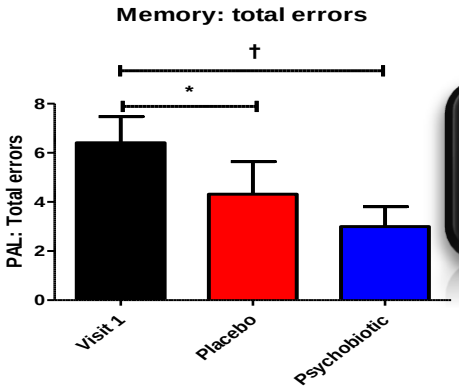
Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

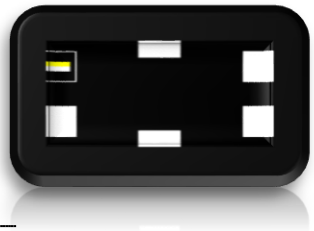












Microbiome Institute
Interfacing Food & Medicine

Medicine Since 1849

Centre for Gerontology and Rehabilitation

HRB Health Research Board

Acknowledgements

D William Molloy
Aoife Ní Chorcoráin
Judy Wall
John F Cryan
Timothy Dinan
Eileen A. Curran
Patricia M Kearney
Gerard Clarke

Caregivers who participated
Nurses at Assessment & Treatment Centre, St Finbarr's Hospital
Poonam Gururajan Glucksman

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

Teagasc Agriculture and Food Development Authority

HSE

CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

sfi Fondúireacht Eolaíochta Éireann Science Foundation Ireland

www.hellobrain.eu/en/carers

Research ongoing at UCC

Microbiome Institute
Interfacing Food & Medicine
http://apc.ucc.ie

Microbiome Institute
Interfacing Food & Medicine

Looking for Healthy Volunteers

Are you a healthy individual aged between 35 and 85 years?

Are you interested in participating in a study investigating physiology, cognitive function, stress and mood?

You will be reimbursed for your participation.

For further details, please contact:

Andrew Allen at andrewallen@ucc.ie

This study is being conducted by the APC Microbiome Institute. The APC Microbiome Institute is a UCC/Teagasc Research Centre funded by Science Foundation Ireland and industry, focusing on gastrointestinal health and development of therapies for debilitating disorders such as Crohn's disease, colitis, irritable bowel syndrome (IBS) and food poisoning (http://apc.ucc.ie).