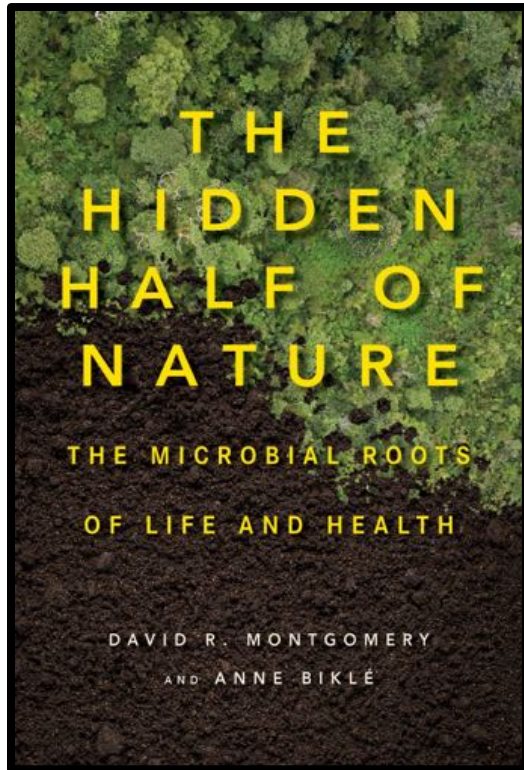


THE HIDDEN HALF OF NATURE

A Journey Thru Microbiomes Reveals Common Ground

David R.
Montgomery
&
Anne Biklé



T: @Dig2Grow

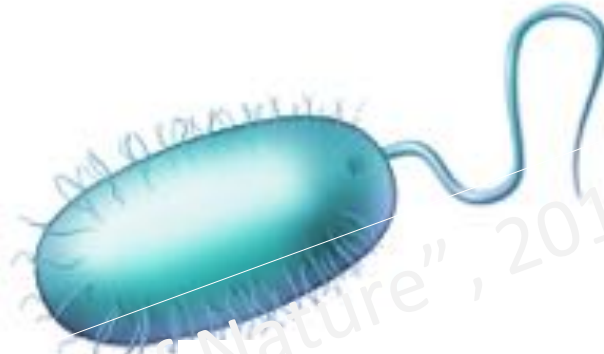
www.Dig2Grow.com

F: Dig2Grow Books

Archaea



Bacteria



Fungi



Viruses



Protists



INVISIBLE

VISIBLE

Red blood cell

Human

Chloroplast

Bacteria

Virus

DNA

Apple

Dog

Ladybug

Amoeba

1 nm

10 nm

100 nm

1 μ m

10 μ m

100 μ m

1 mm

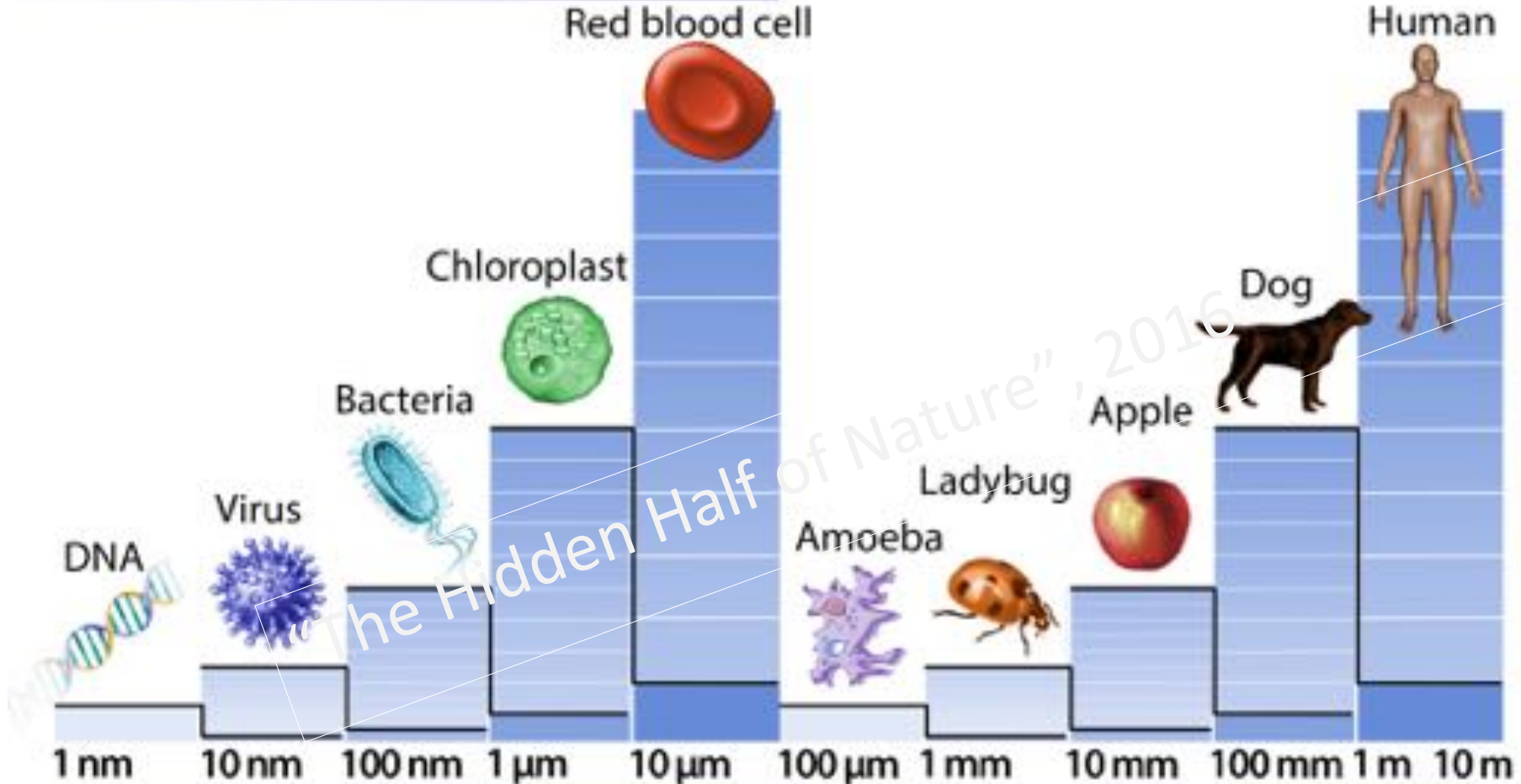
10 mm

100 mm

1 m

10 m

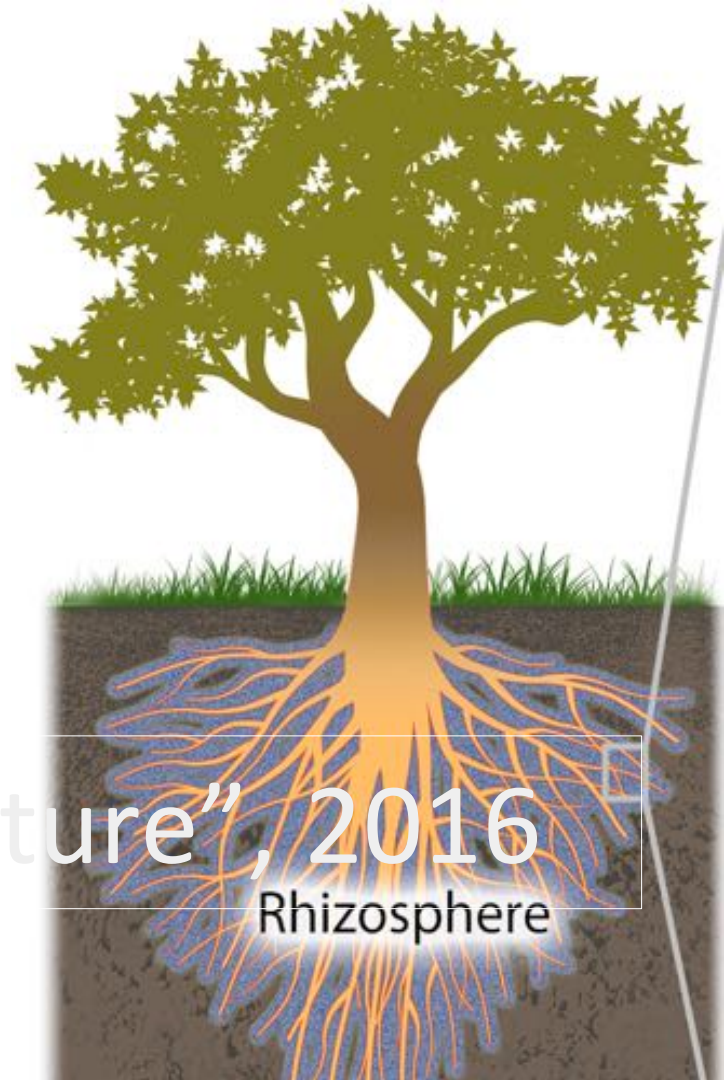
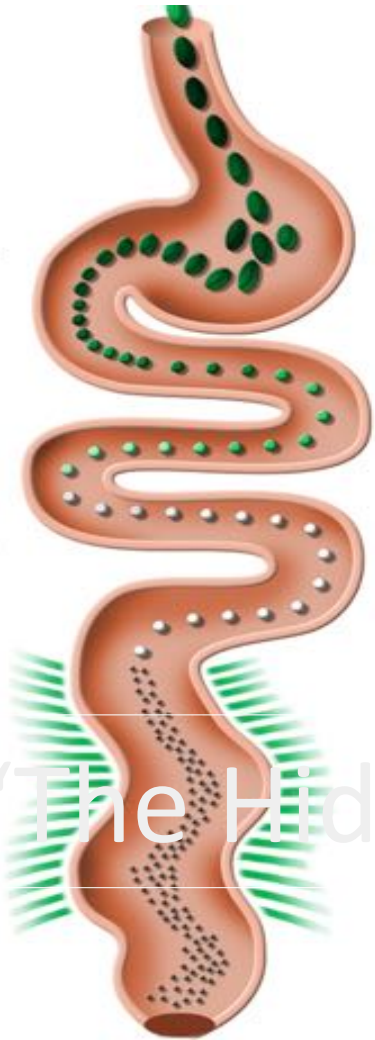
"The Hidden Half of Nature", 2016



Roots, guts,
microbes,
and soil... this
story started
close to
home.

“The Hidden Half of Nature”, 2016

Rhizosphere











Green Goods

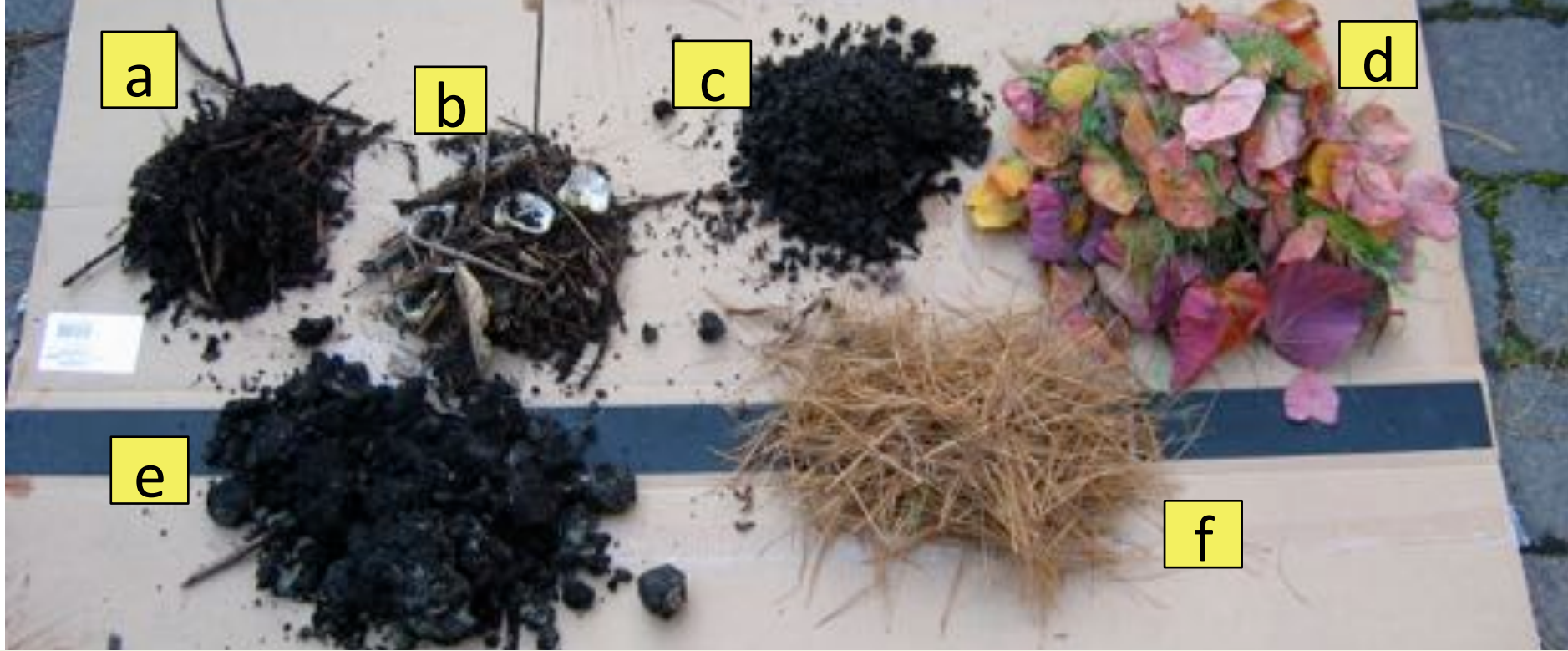


Nitrogen

Brown Goods



Carbon



a= wood chips & compost

b= a + shells

c= zoo doo - N

d= grass & fresh leaves -N

e= coffee (composted) -N

f= pine needles - C

The Living Goods



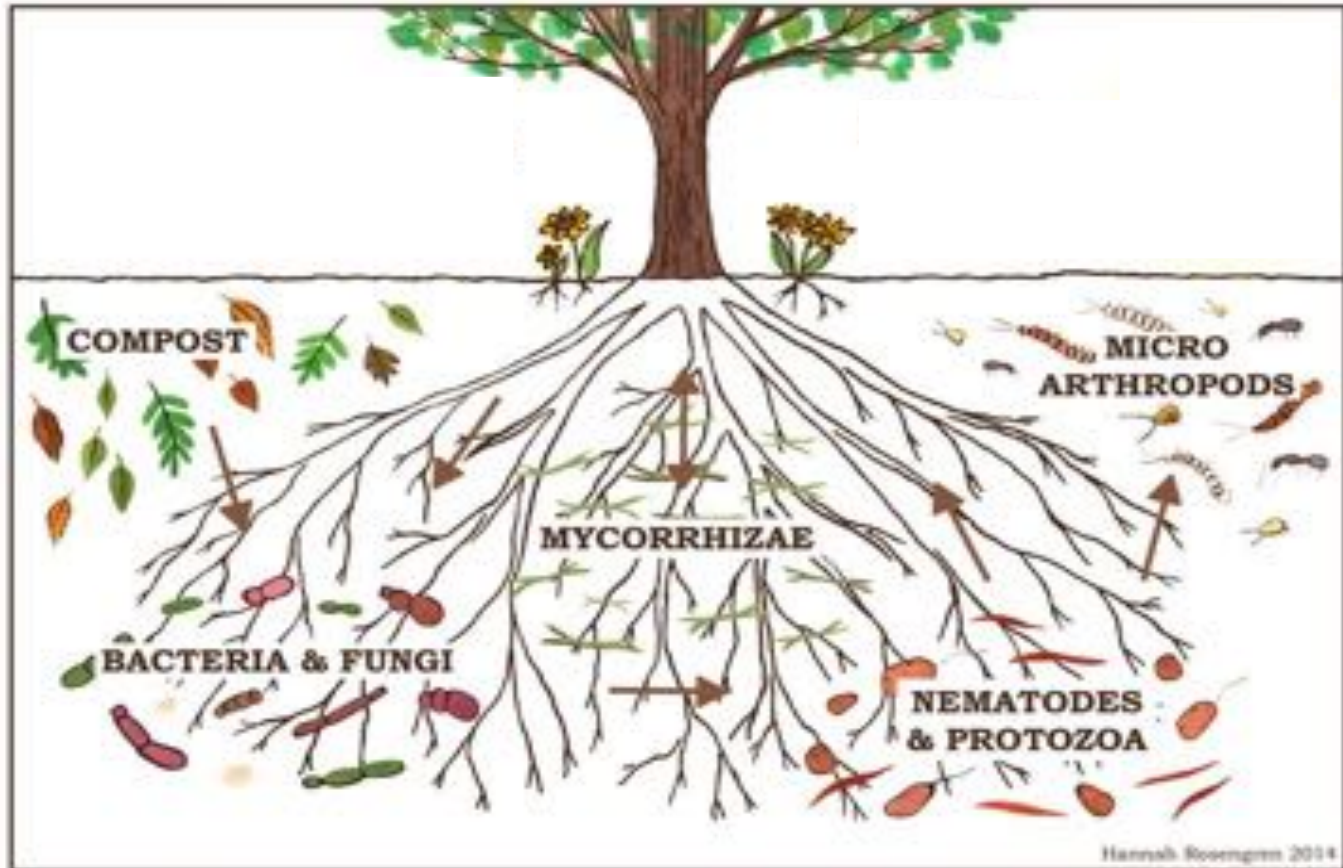




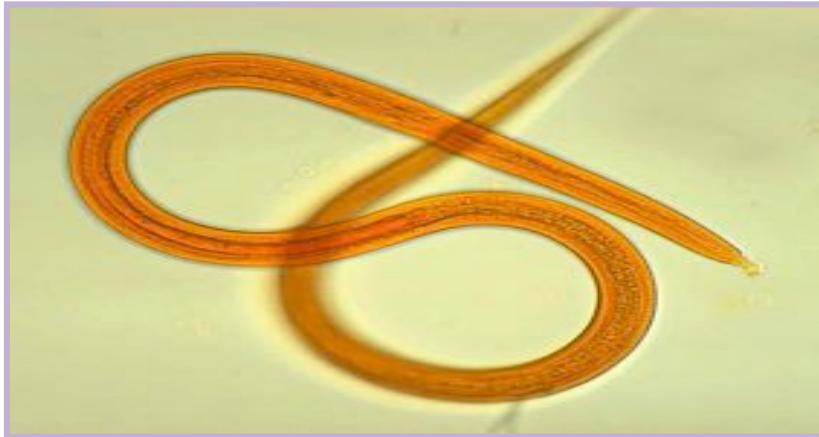
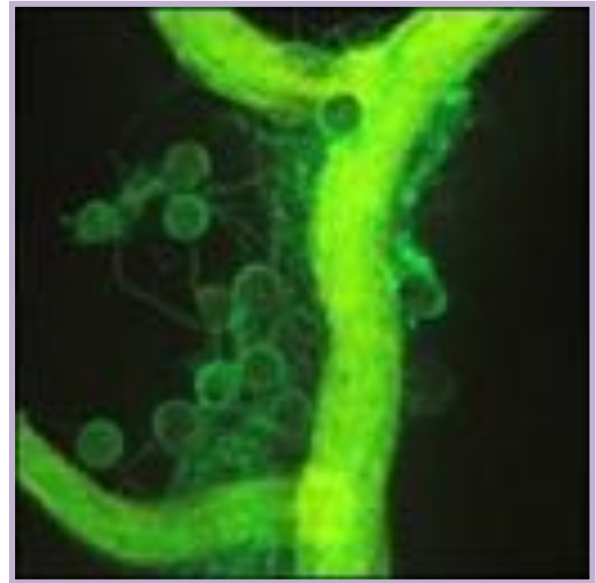


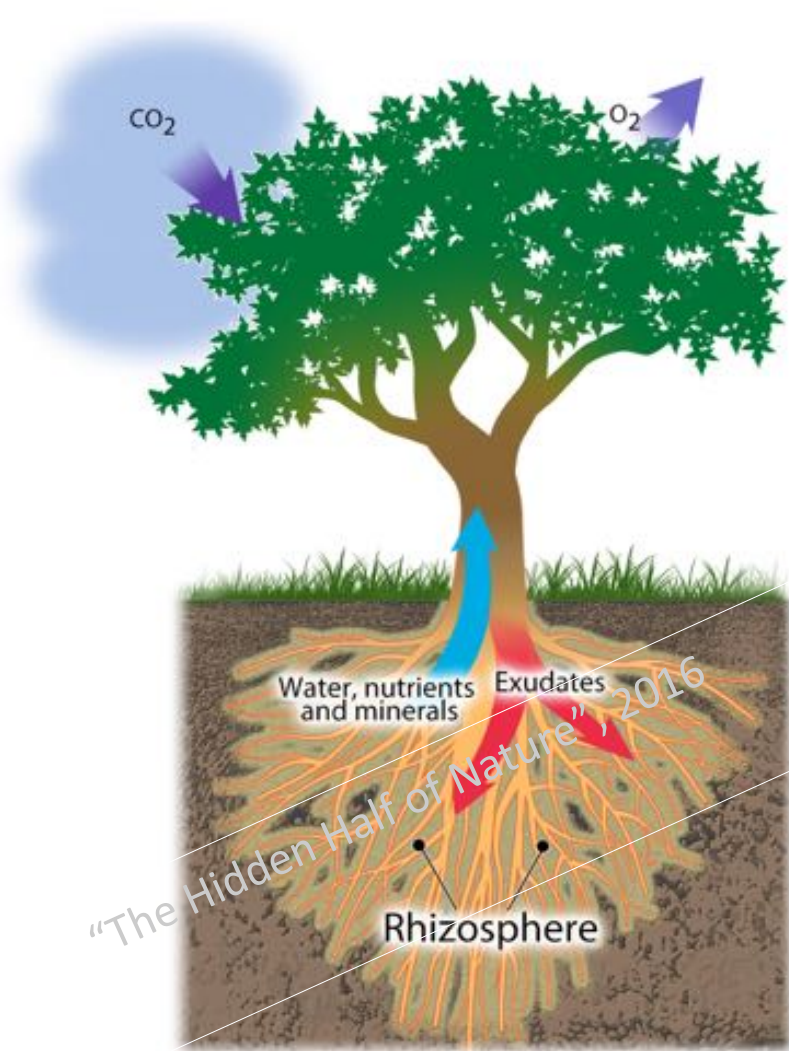


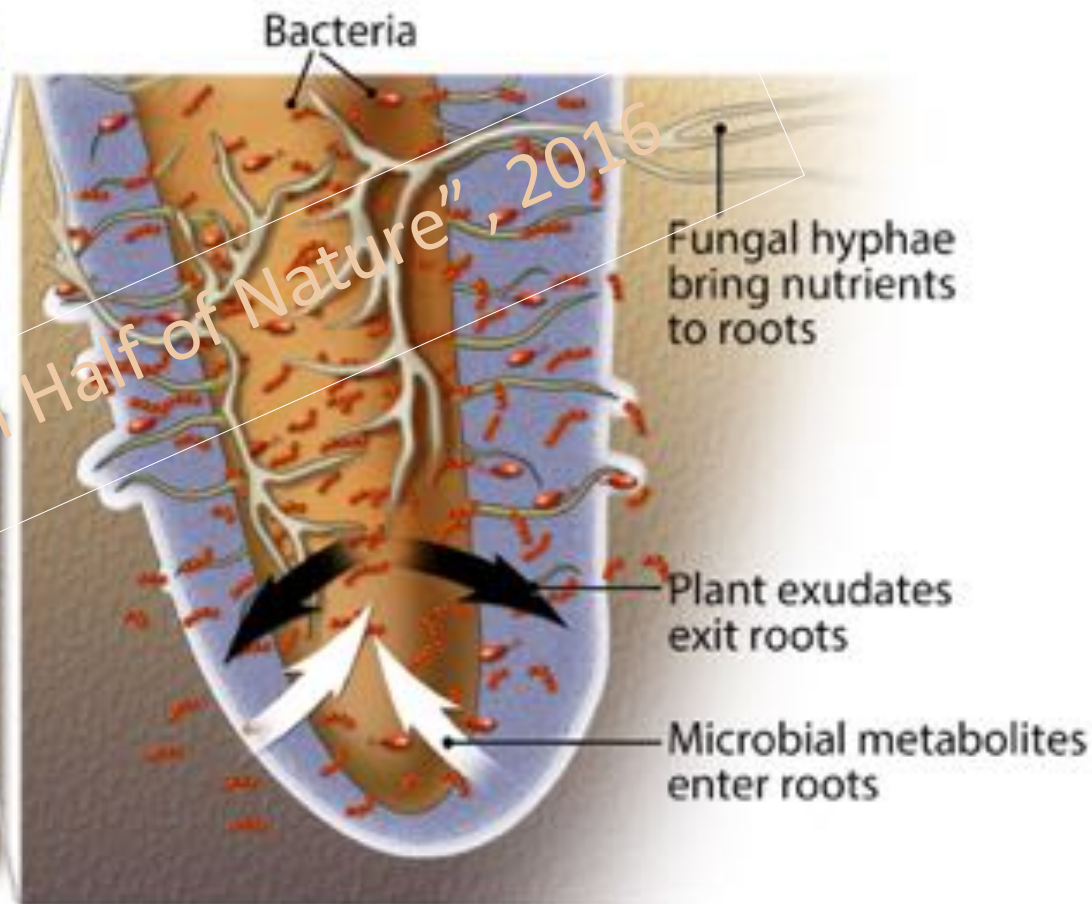
What happened? We fed the soil microbiome



Microbes



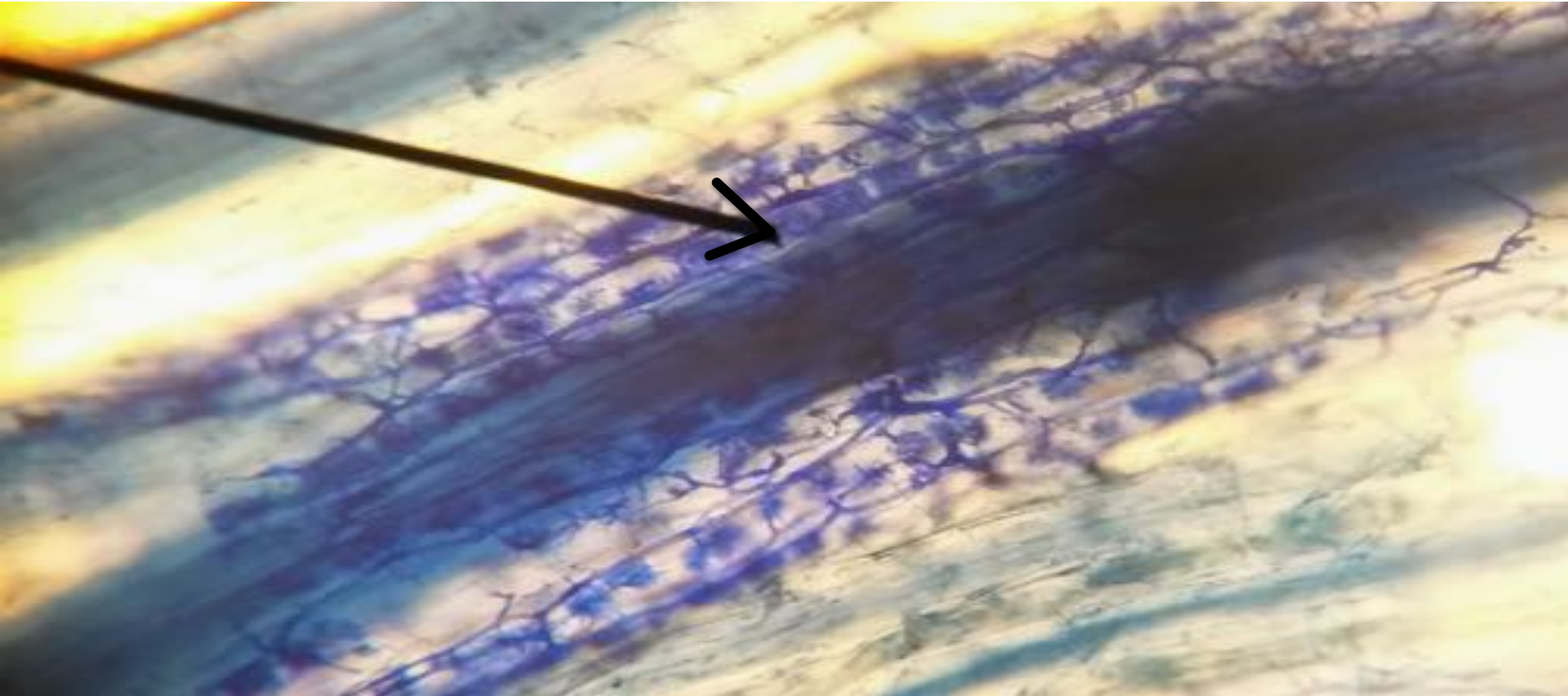




fetching fungi

minerals

Arbuscular mycorrhizal fungi *inside* of plant root cell



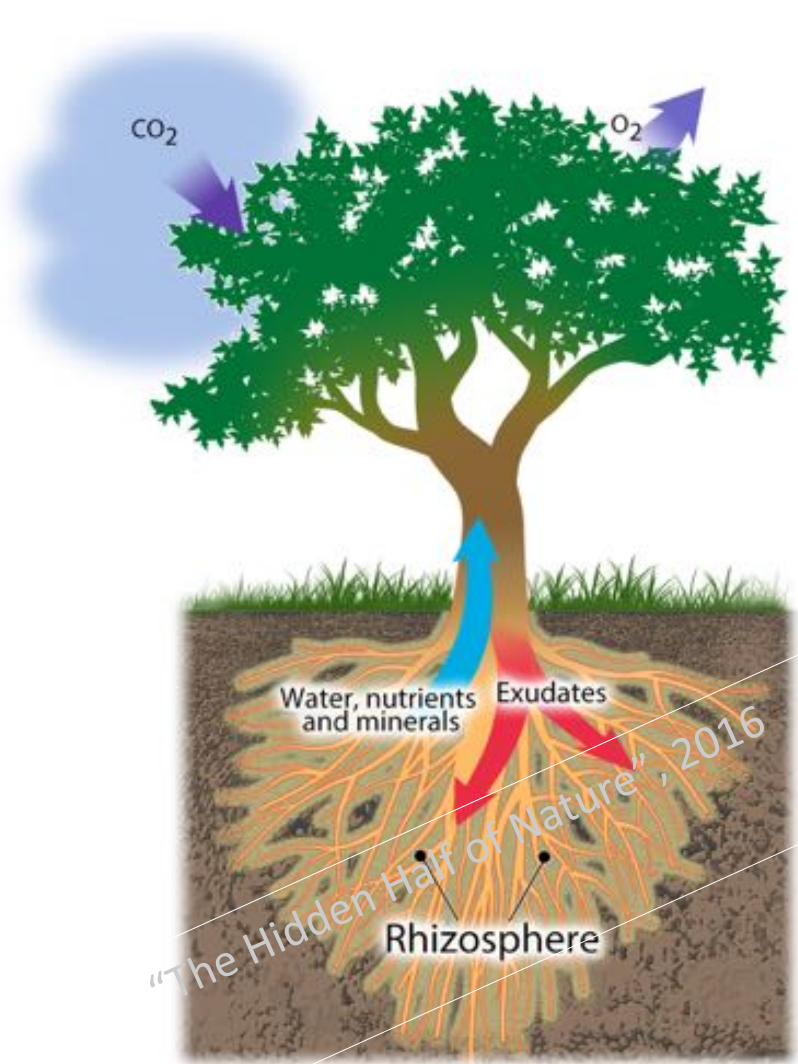
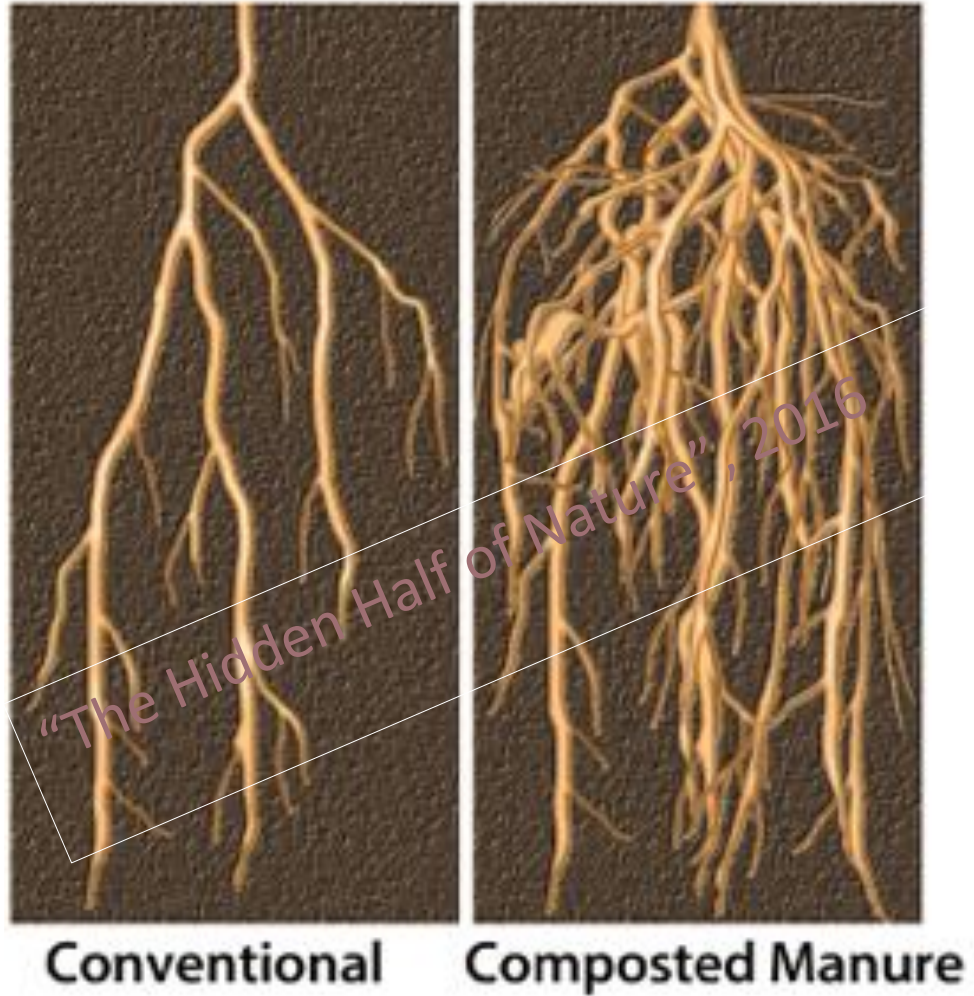


photo: Christina Matheson

Conventional
fertilizers reduce
root growth and
exudate
production





Fertilizer Diet



N, P, K

micro-
nutr's.

good
metab's

Soil Life Diet



"The Hidden Half of Nature", 2016

Archaea



Bacteria



Fungi



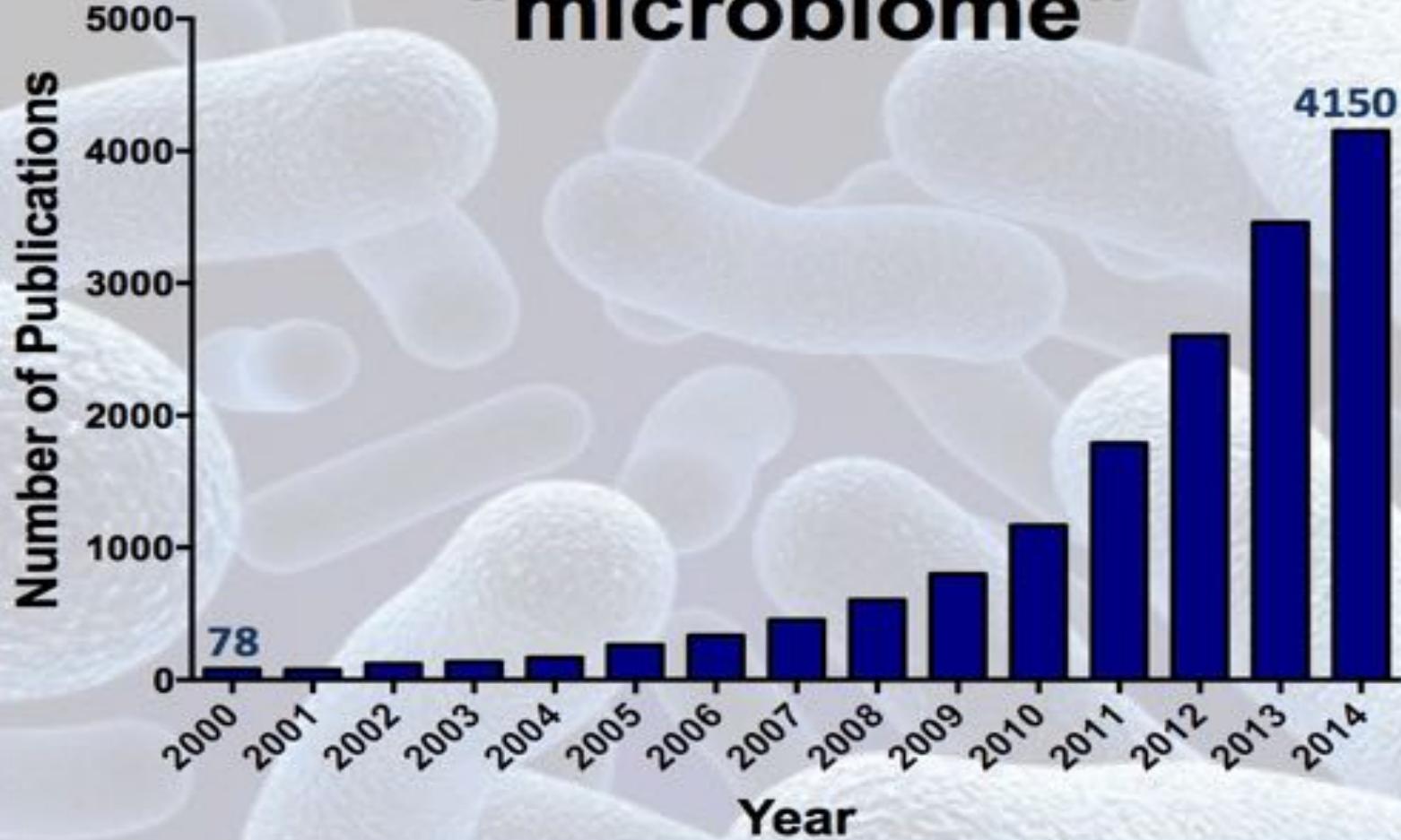
Viruses



Protists



Hits from a Pubmed search for the term "microbiome"

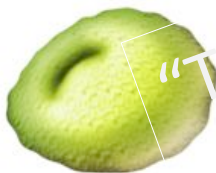
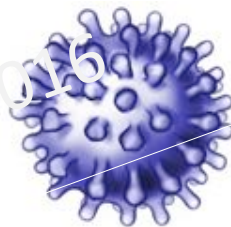
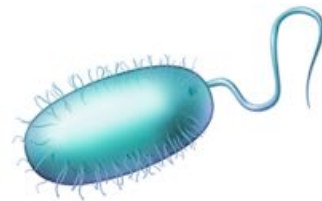


2017

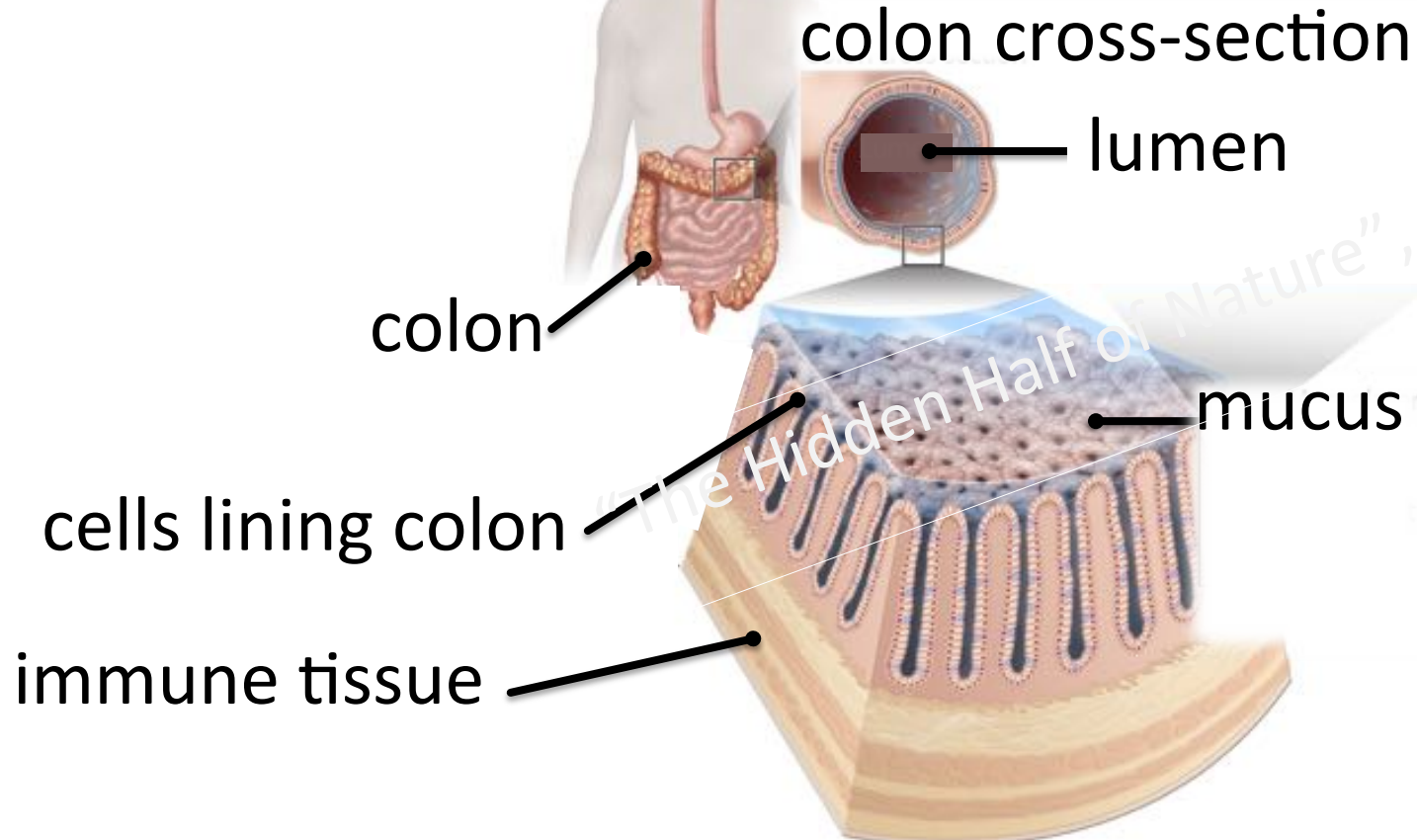


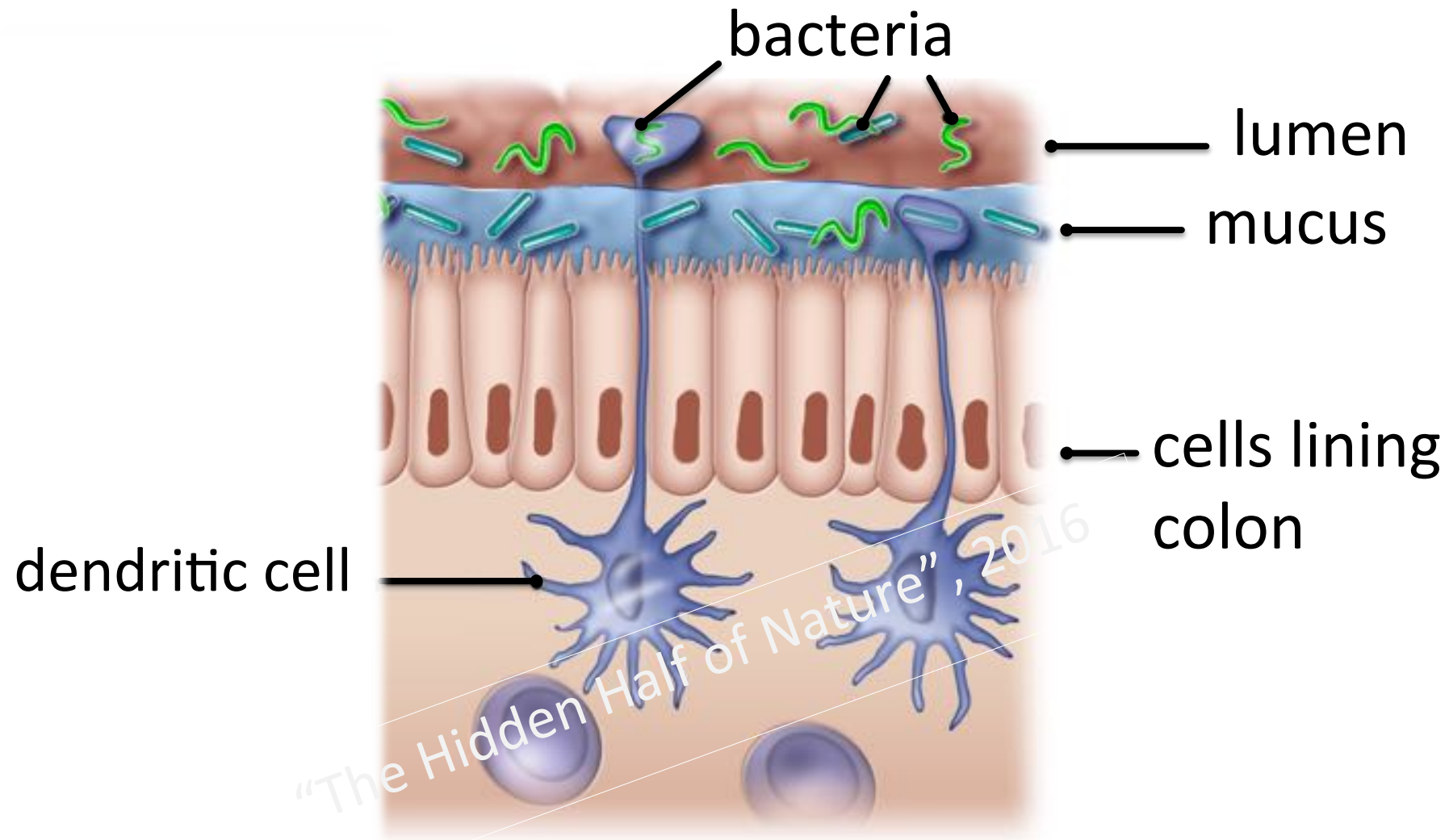
CELLS

GENES

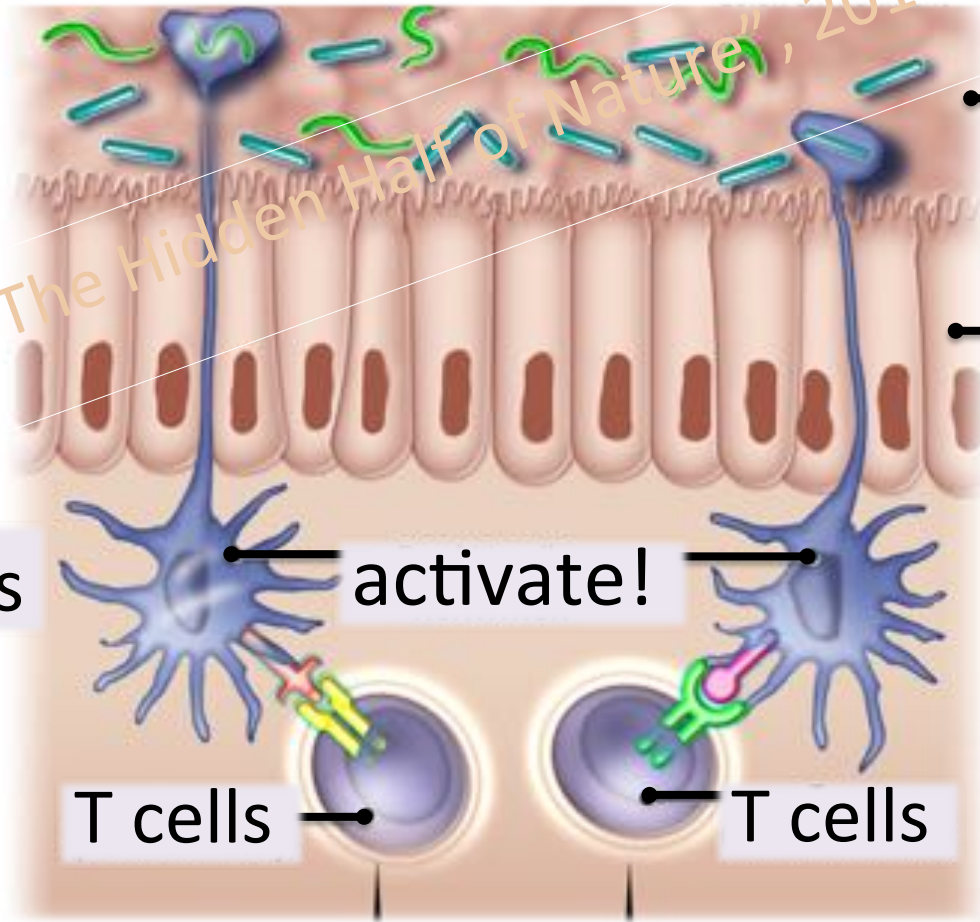


HEALTH





"The Hidden Half of Nature", 2016



— colon habitat

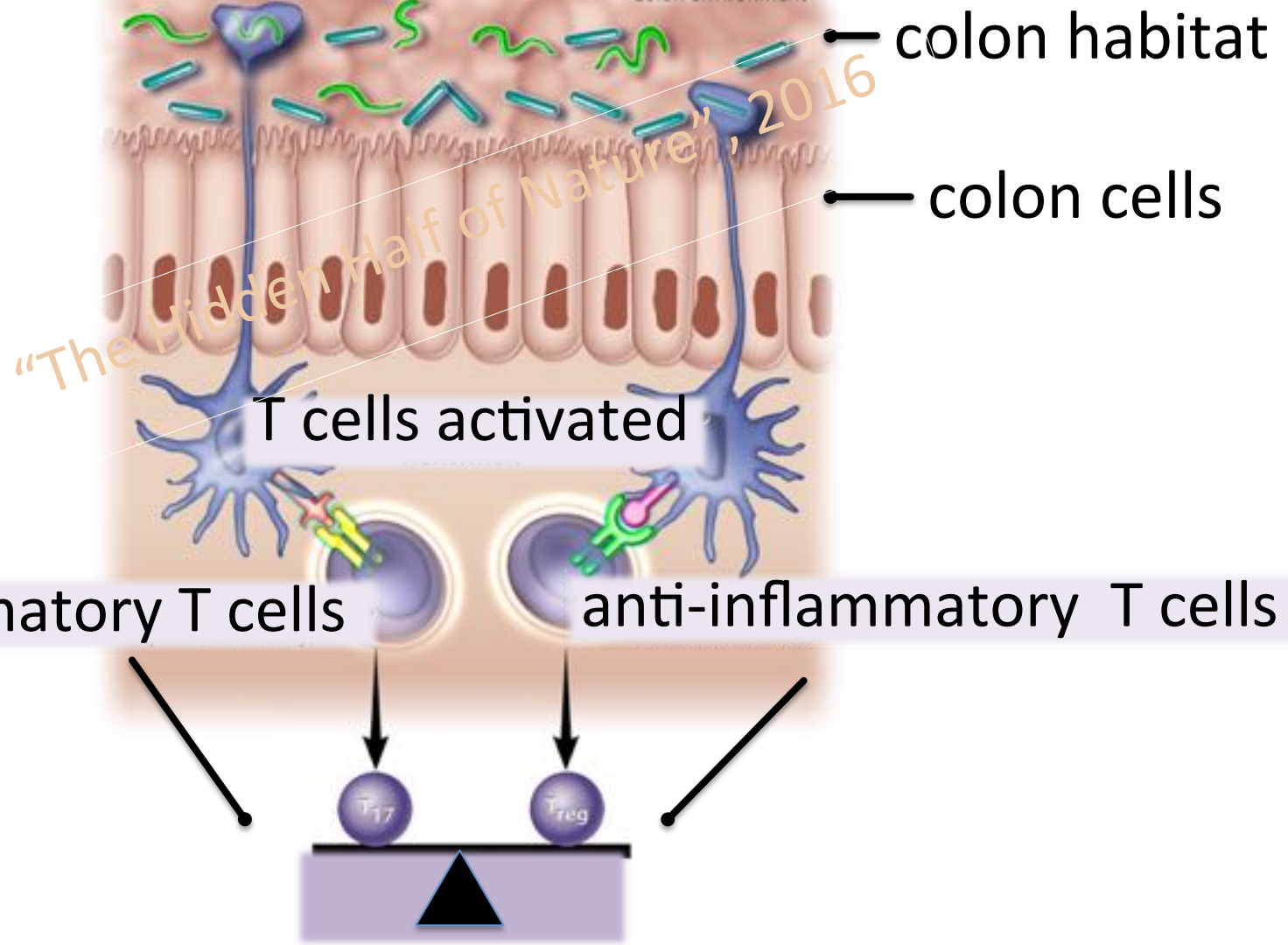
— cells lining
colon

dendritic cells

activate!

T cells

T cells



The Other View = Germ Theory



LONDON'S Dreadful Visitation:

Or, A COLLECTION of All the

Bills of Mortality

For this Present Year:

Beginning the 27th of December 1664. and
ending the 19th. of December following:

As also, The GENERAL or whole years BILL:

According to the Report made to the
KING'S Most Excellent Majesty,

By the Company of Parish-Clerks of London. &c



LONDON:

Printed and are to be sold by E. Cotes living in Aldersgate-street.
Printer to the said Company 1665.

The Diseases and Casualties this Week.



A Bortive	5	Imposthume	11
Aged	43	Infants	16
Ague	2	Killed by a fall from the Bell fry at Alhallows the Great	1
Apoplexie	1	Kingevil	3
Bleeding	2	Lethargy	1
Burnt in his Bed by a Candle at St. Giles Cripplegate	1	Palſie	1
Canker	1	Plague	7165
Childbed	42	Rickets	17
Chriſomes	18	Riſing of the Lights	11
Consumption	134	Scowring	5
Convulſion	64	Scurvy	2
Cough	2	Spleen	1
Drople	33	Spotted Fever	105
Feaver	309	Stillborn	17
Flox and Small-pox	5	Stone	2
Frighted	3	Stopping of the Stomach	9
Gowt	1	Strangury	1
Grief	3	Suddenly	1
Gripping in the Guts	51	Surfeit	49
Jaundies	5	Teeth	121
		Thrush	5
		Timpany	1
		Tiſick	11
		Vomiting	3
		Winde	3
		Wormes	15

Chriftned	Males — 95	Buried	Males — 4095	Plague — 7165
	Females — 81		Females — 4202	
	In all — 176		In all — 8297	

Increased in the Burials this Week — 607

Parishes clear of the Plague — 4 Parishes Infected — 126

The Aſſize of Bread ſet forth by Order of the Lord Maior and Courts of Aldermen,
A penny Wheaten Loaf to contain Nine Ounces and a half, and three
half-penny White Loaves the like weight.

Change in Disease

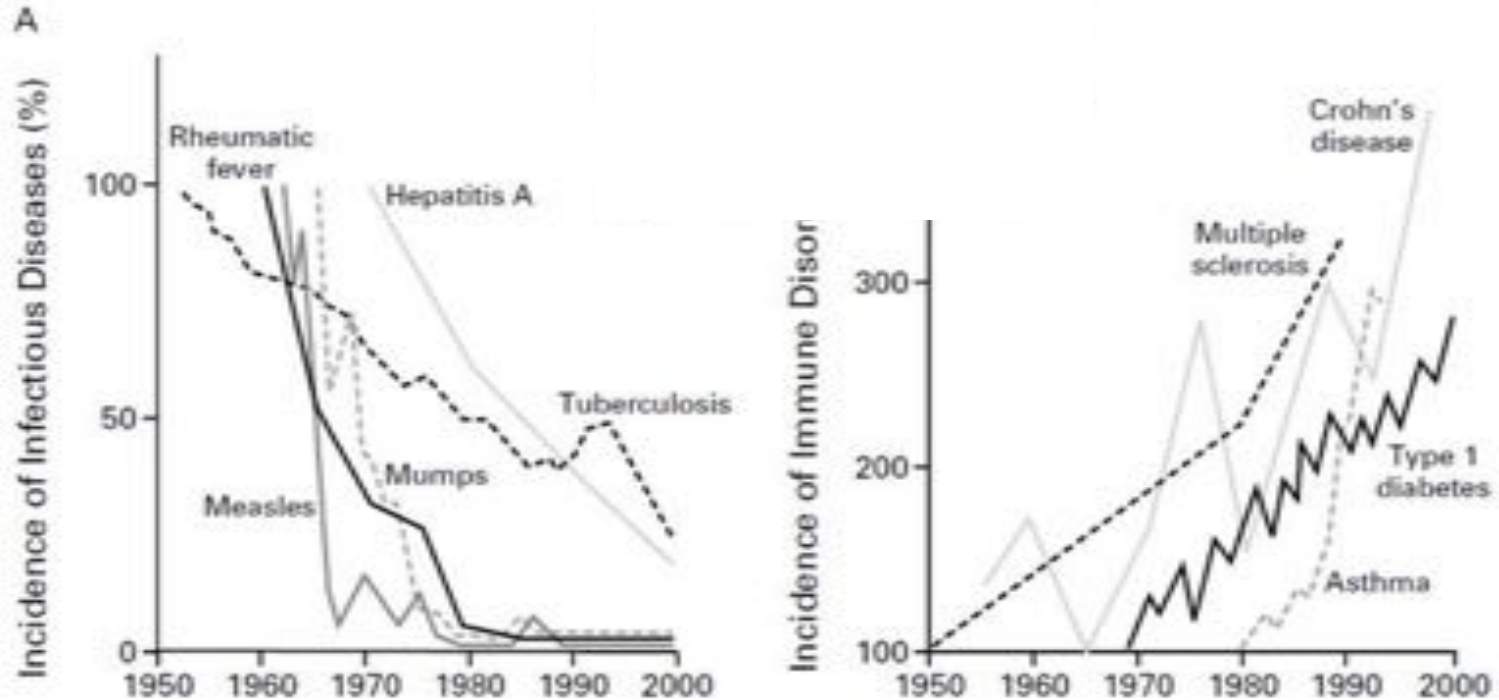


Figure 1. Inverse Relation between the Incidence of Prototypical Infectious Diseases (Panel A) and the Incidence of Immune Disorders (Panel B) from 1950 to 2000.



allergies, autism,
certain cancers,
depression, gut
disorders, heart
disease, obesity, type
1 and type 2 diabetes,
and on and on it
goes...



HYPOTHESIS



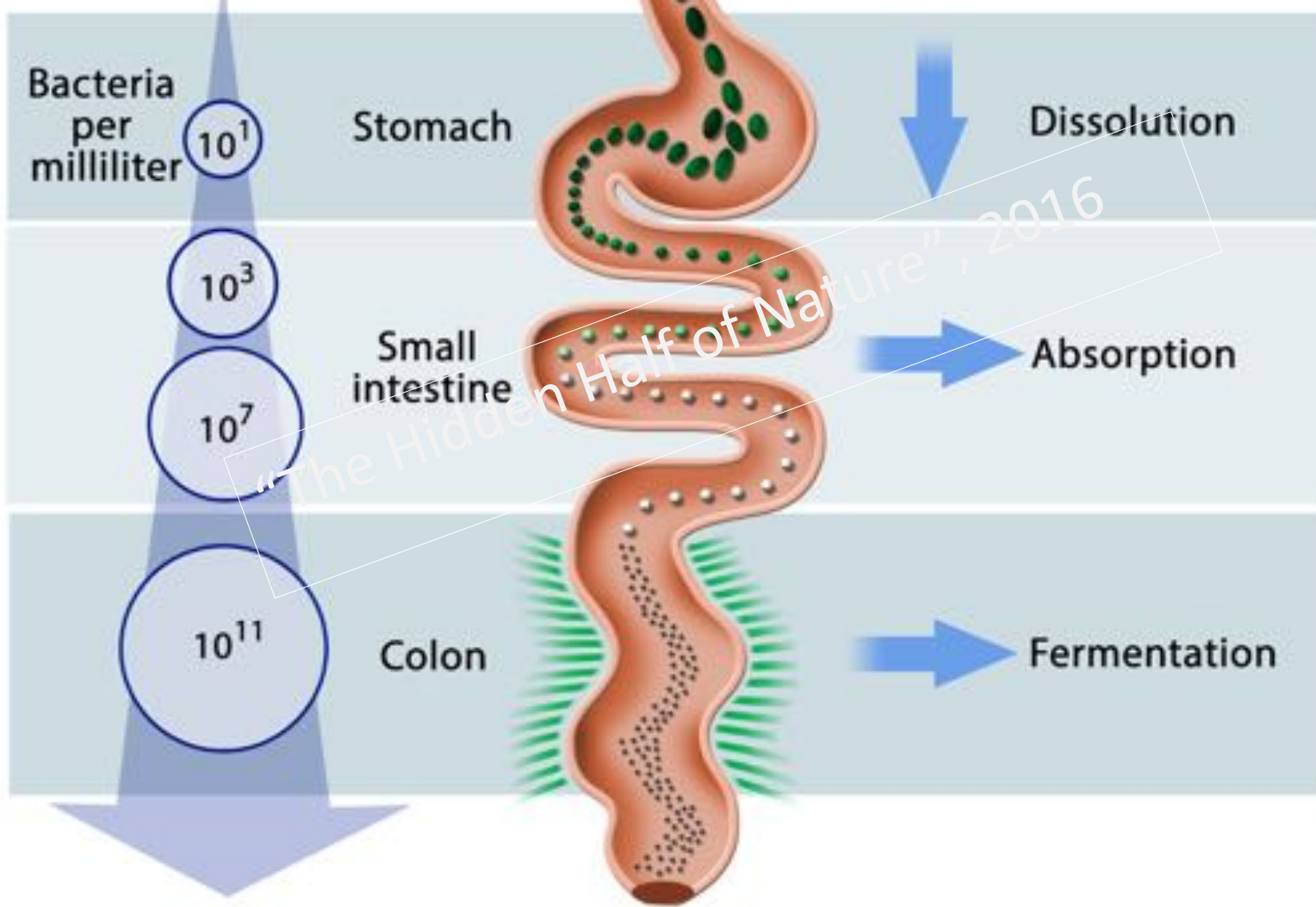
MISSING OUR
MICROBES?

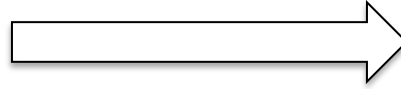


"The Hidden Half of Nature", 2016

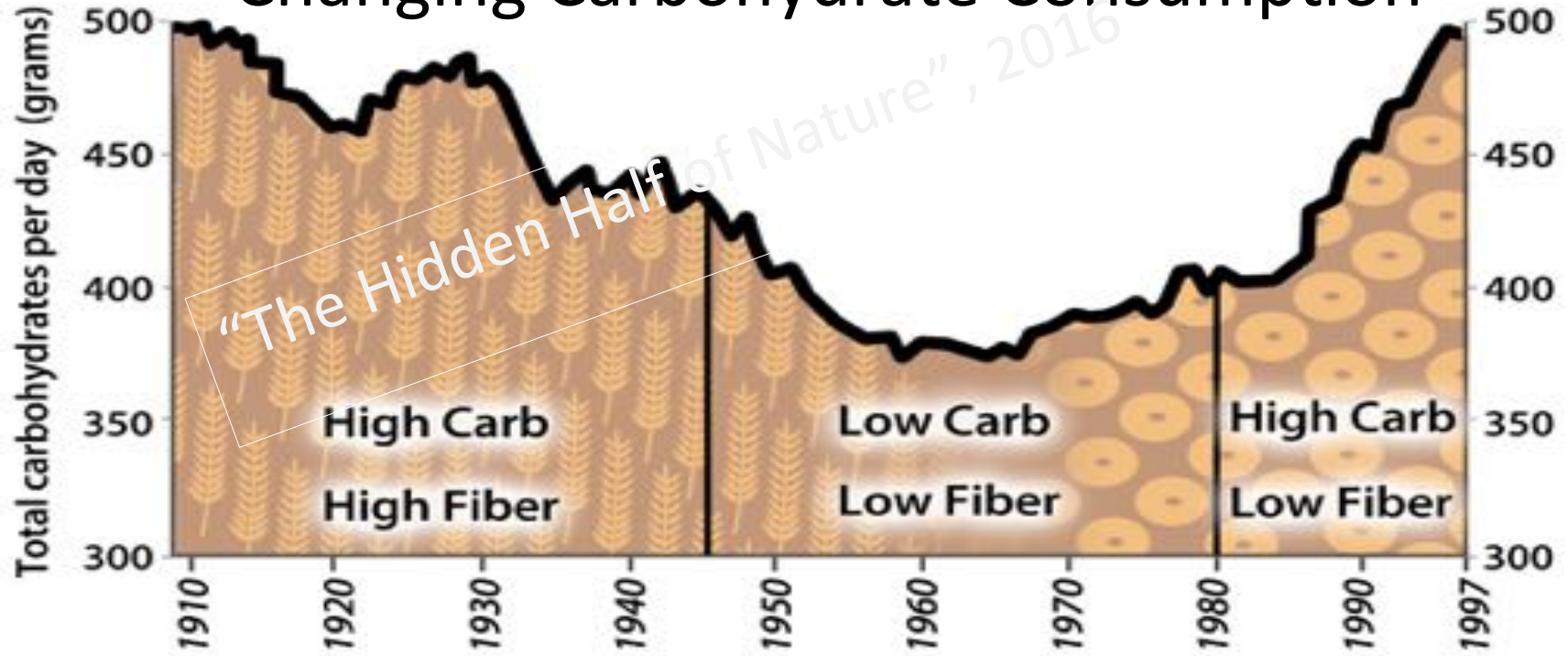


K. Diemert





Changing Carbohydrate Consumption





fiber

microbiome

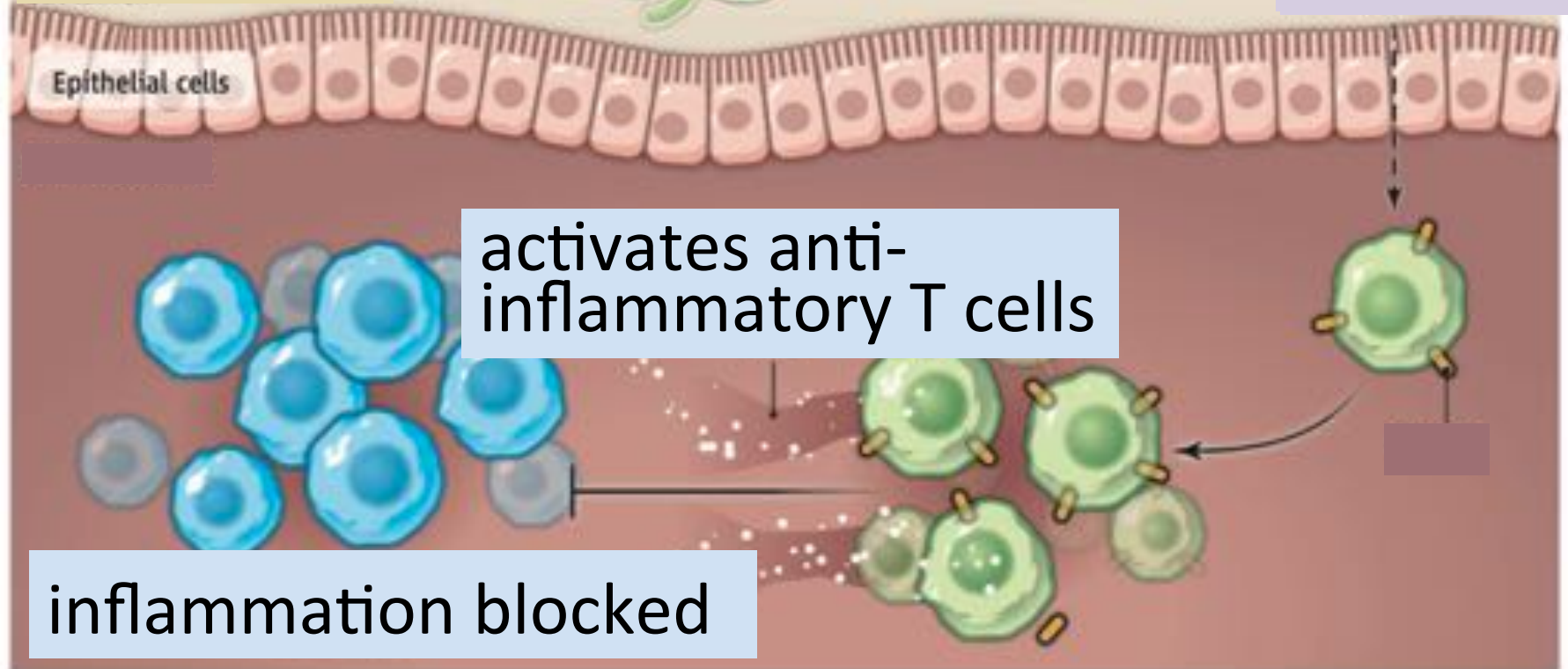
metabolites

butyrate

Epithelial cells

activates anti-inflammatory T cells

inflammation blocked



The New View





How *do* we
feed our
symbiotic
dinner guests?

Western Diet

simple
carbs

harmful
metab's

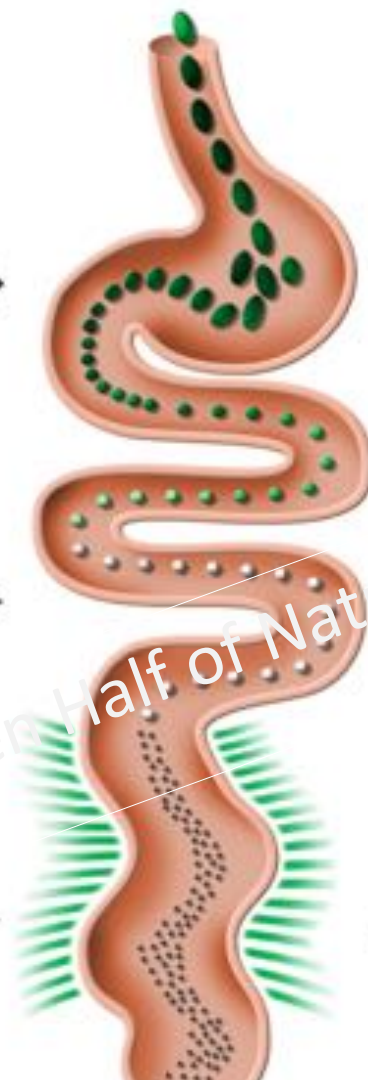
good
metab's

Inner Garden Diet

simple
carbs

harmful
metab's

good
metab's







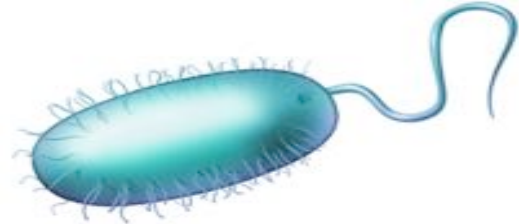
“Make The Plate”

protein

veg & fruits



minimally processed whole grains



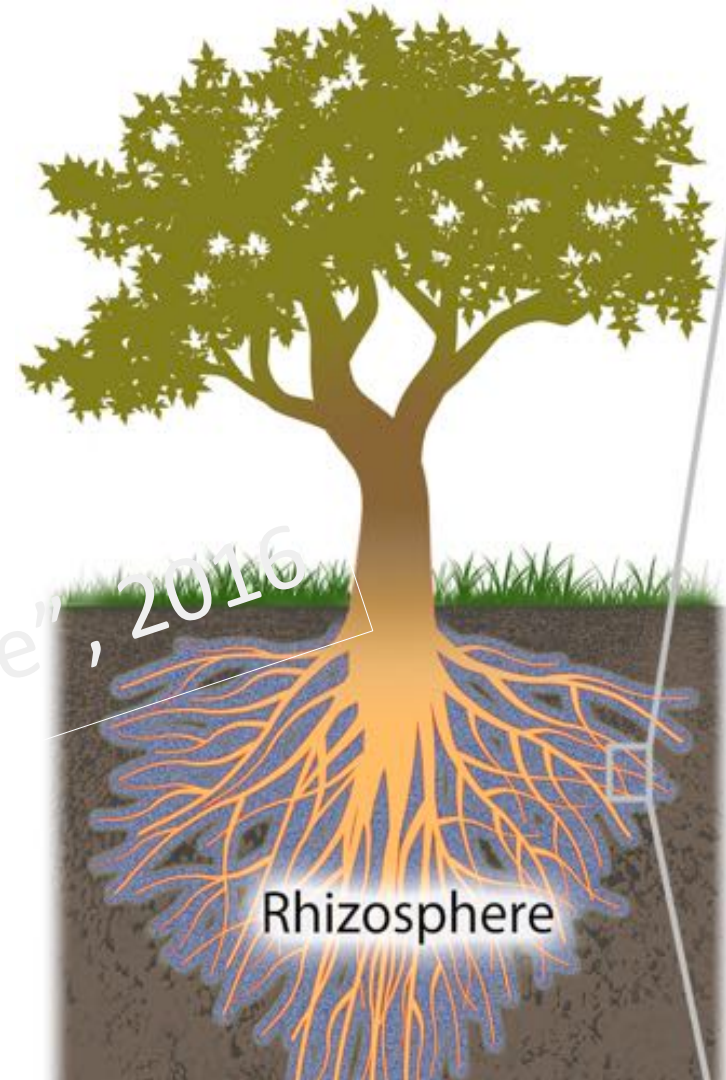
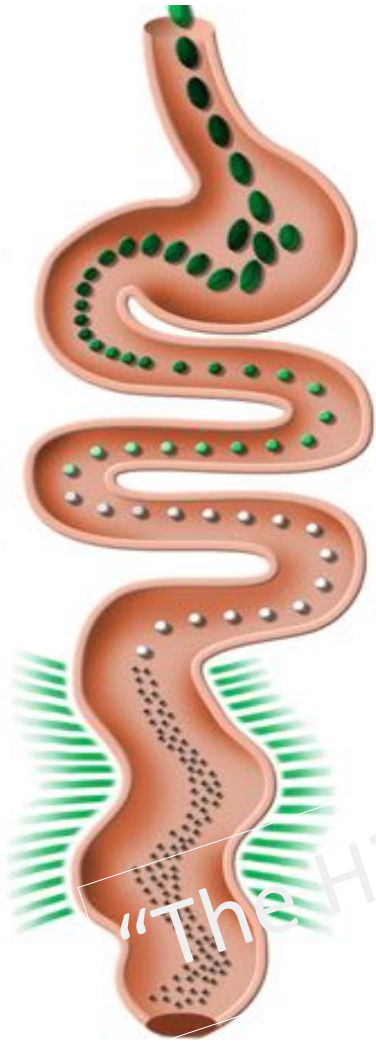
"The Hidden Half of Nature", 2016

Gut = Root

Nutrients

Microbial
metabolites

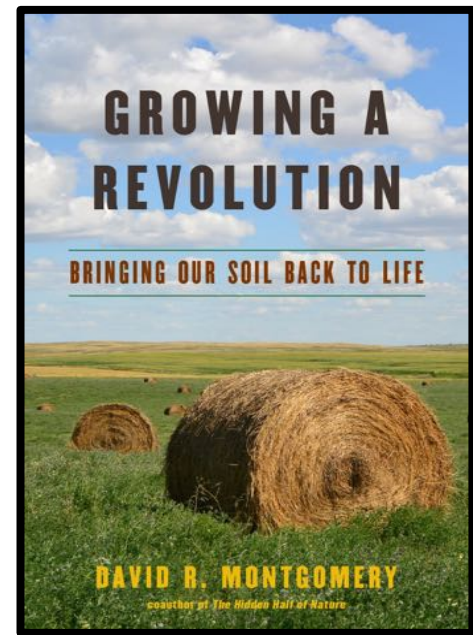
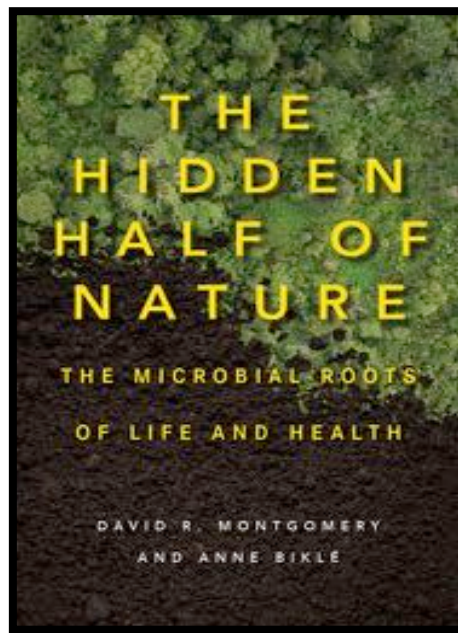
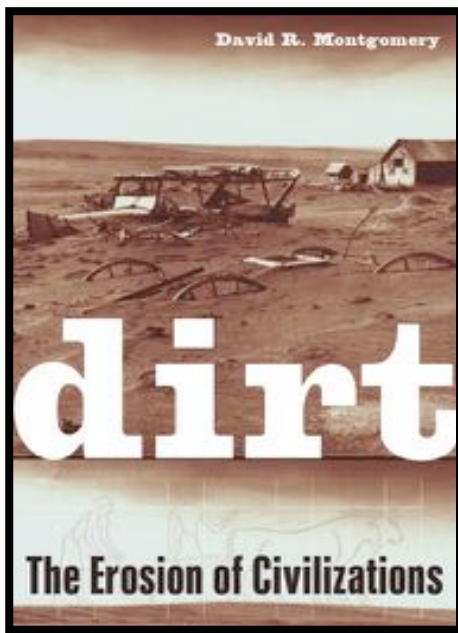
Immunity &
Defense





Jessica Fortner

**“MULCH
YOUR SOIL—
INSIDE AND
OUT”**



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