

environmentální mikrobiologie & přirozená atenuace

jiří mikeš

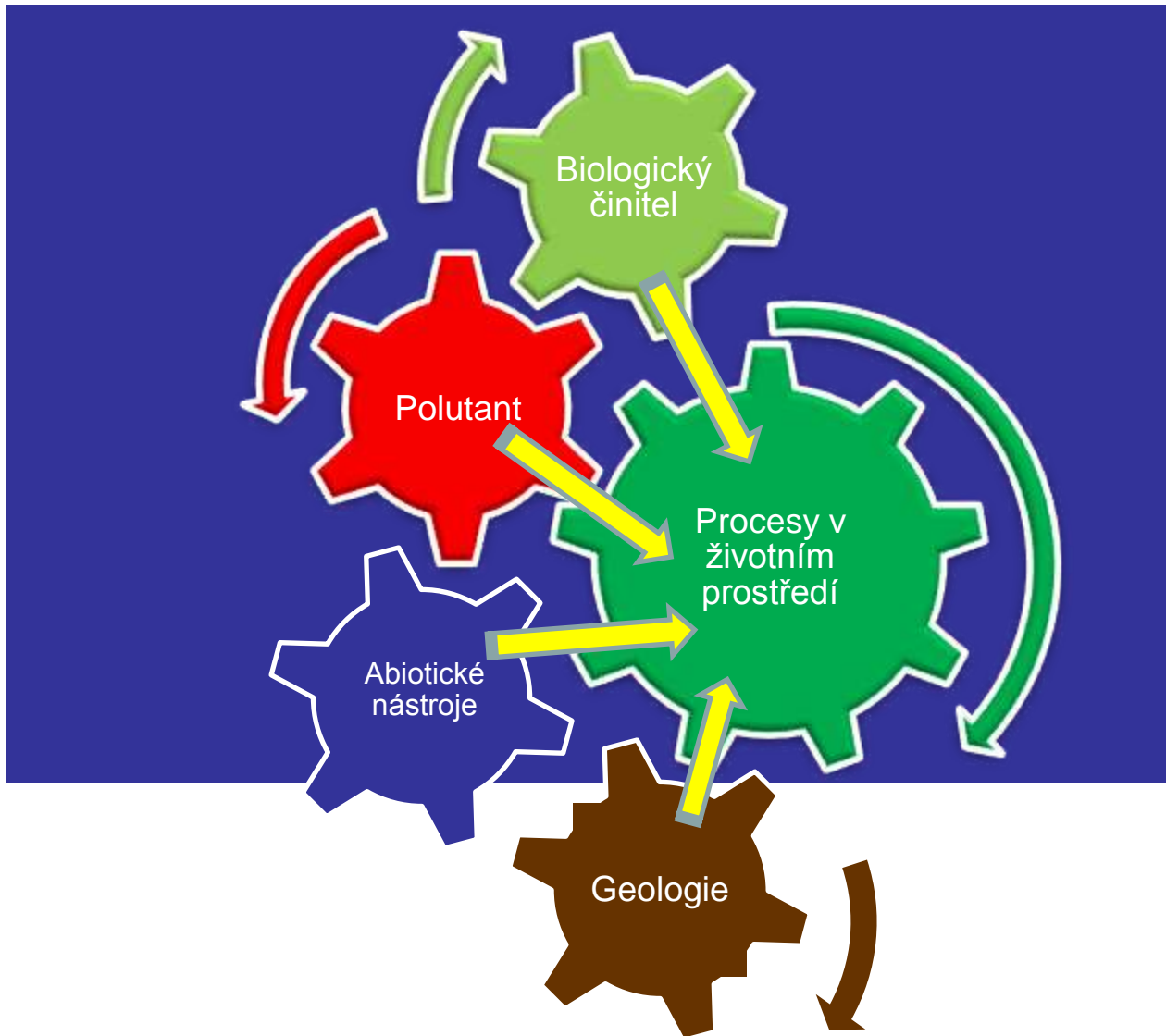


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US Environmental Protection Agency

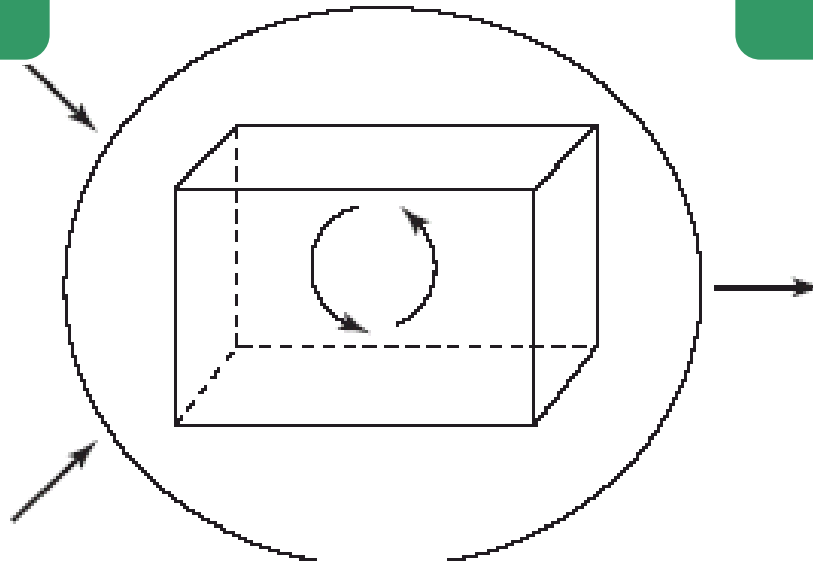
Figure 19-43a Brock Biology of Microorganisms 11/e
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environmentální mikrobiologie

Tok hmoty

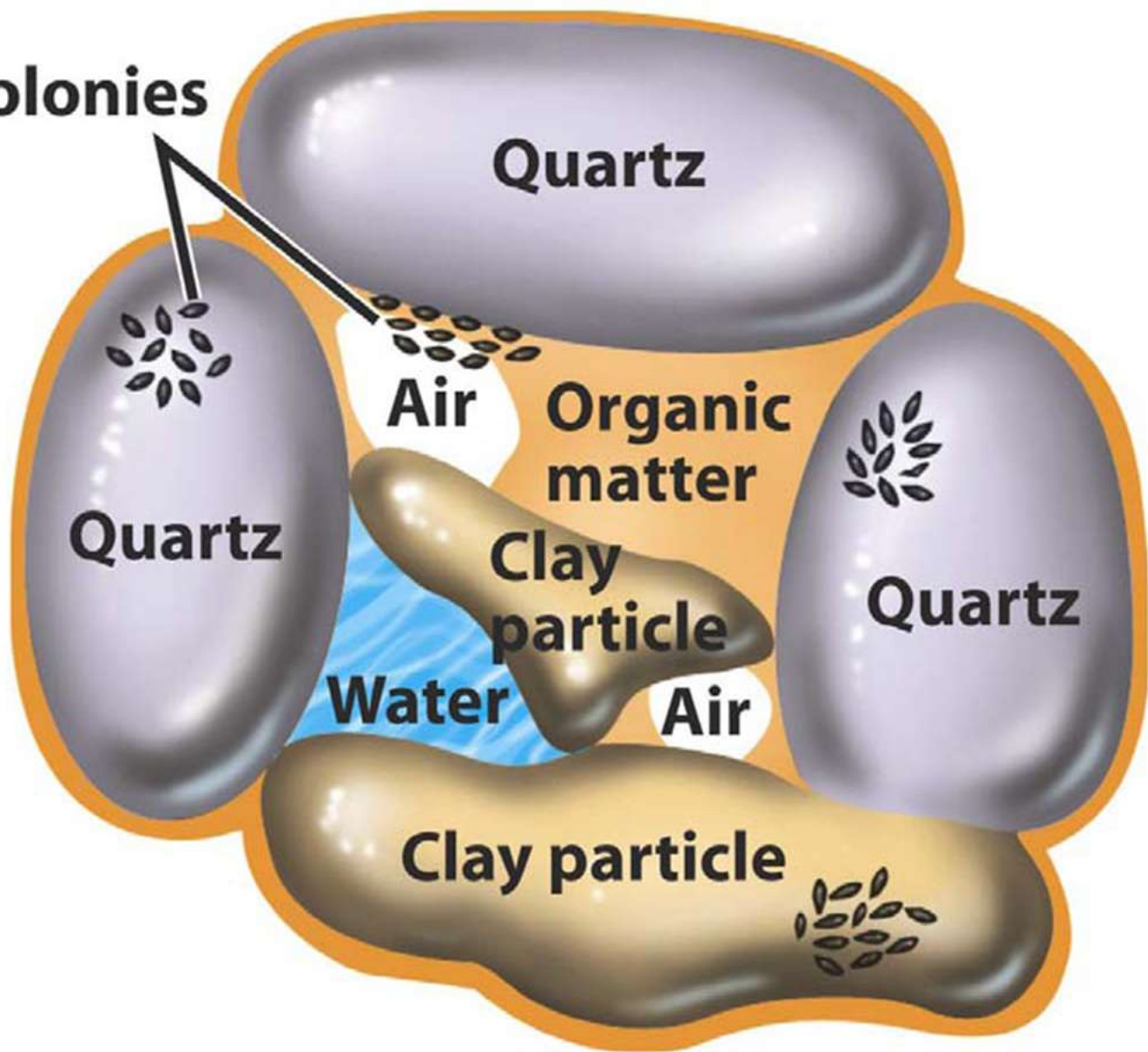
Tok energie



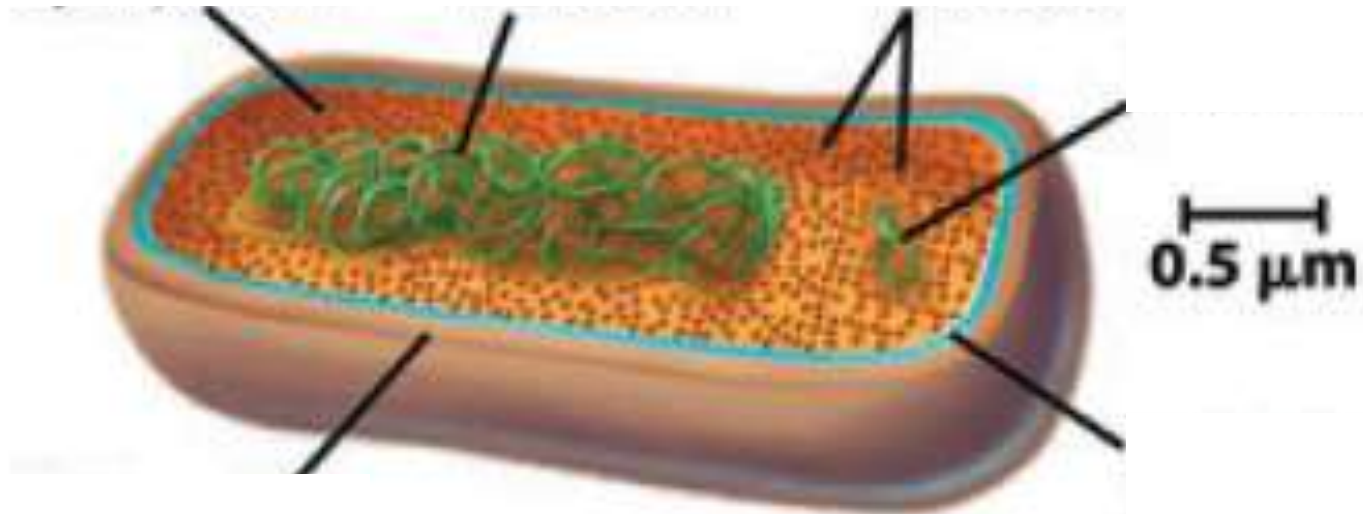
Životní prostředí

Tok informací

Microcolonies



mikroorganismus



mikroorganismy

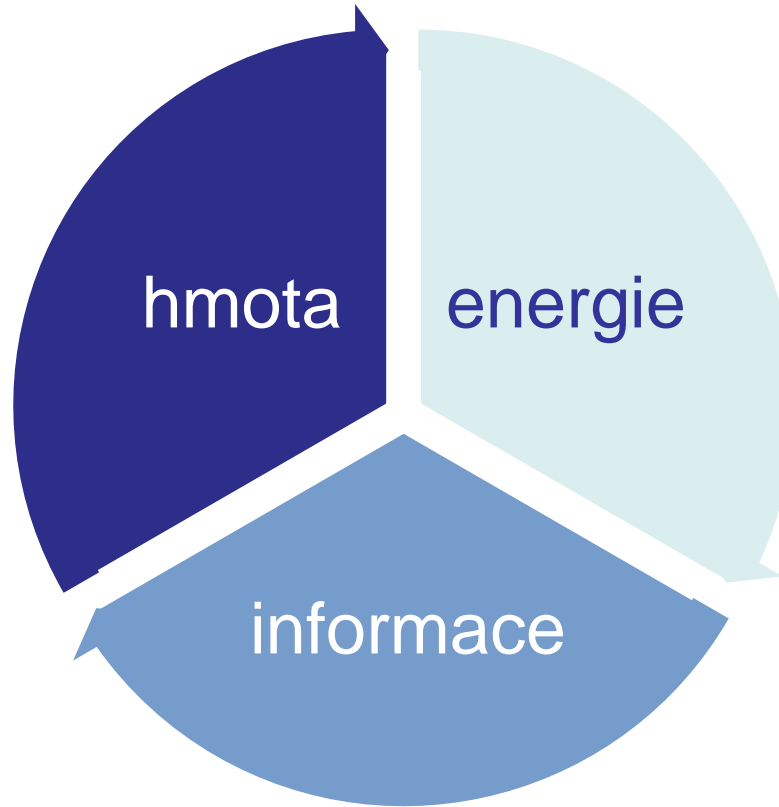
prostředí

fyziologie

morfologie

metabolismus

genetika



ekologie

biologie

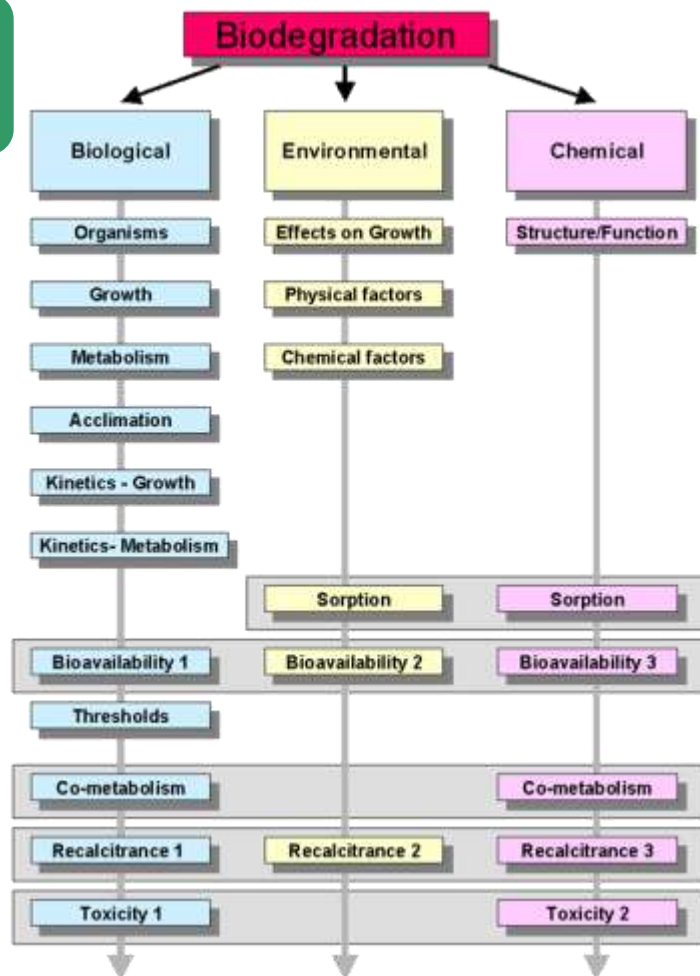
biologie

chemie

chemie

faktory

biologická
dostupnost



biologická
dosažitelnost

metabolismus

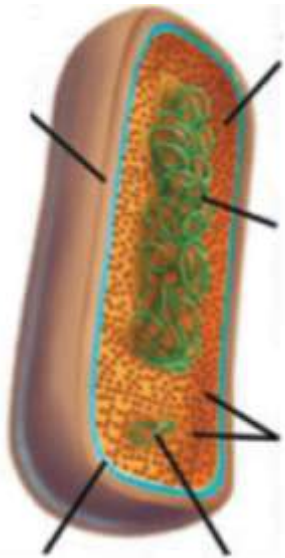
polutant,
sacharid, tuk,
bílkovina

Oxidace zdroje
uhlíku a energie
(substrátu)

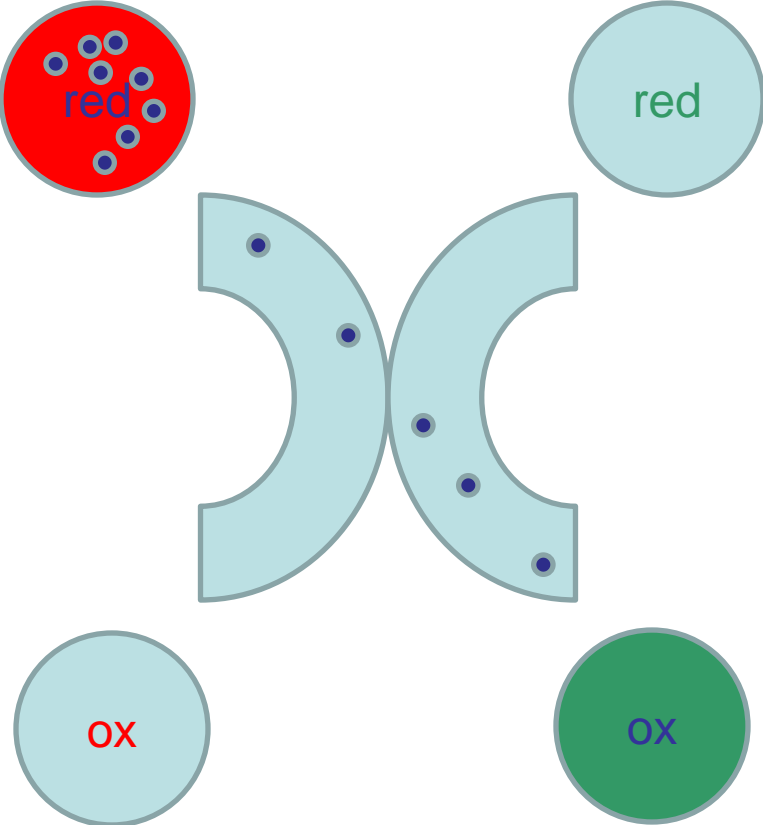
kometabolismus

Redukce
akceptoru
elektronů

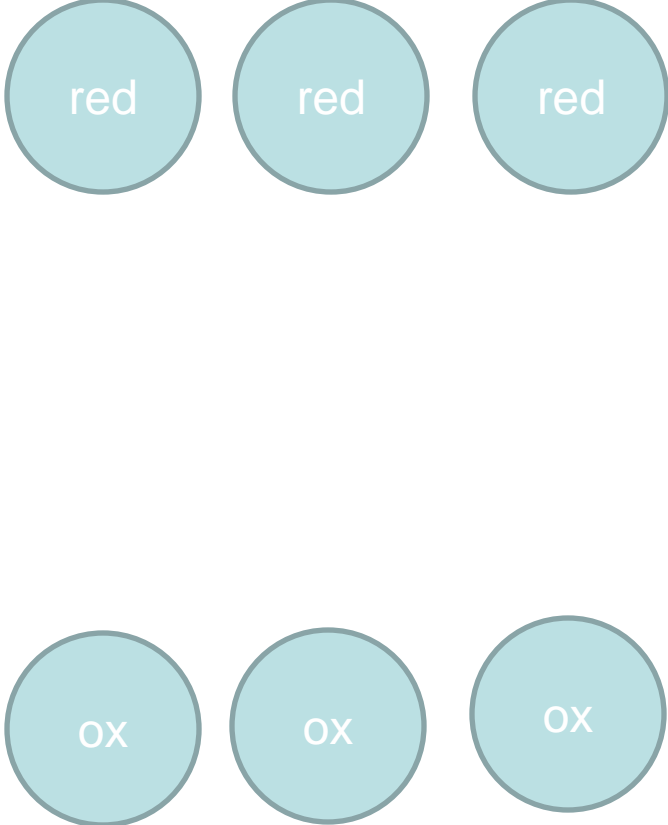
kyslík, dusičnan,
železo, mangan,
síran, oxid uhličitý



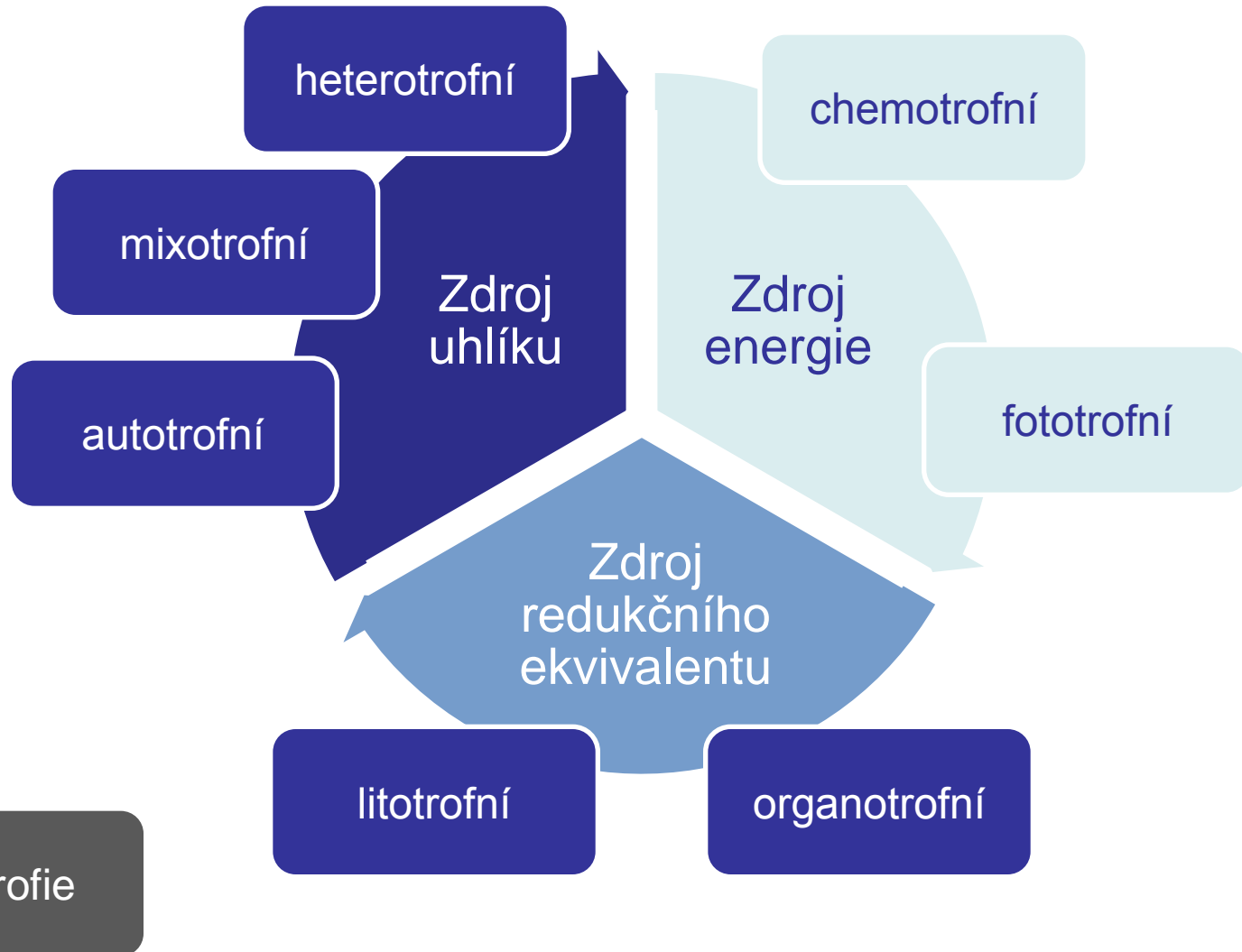
metabolismus



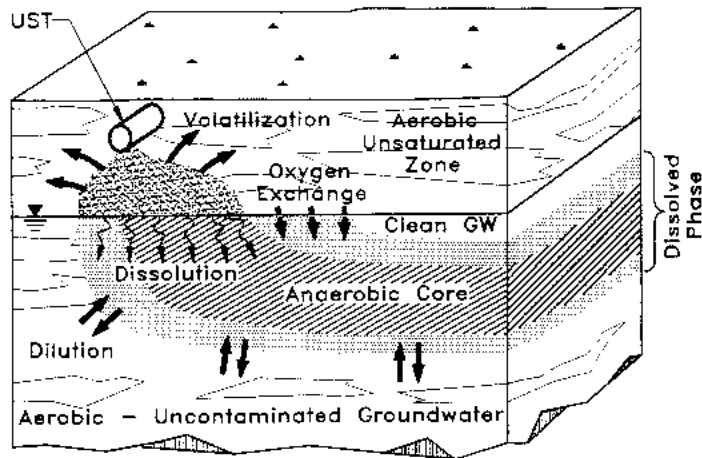
kometabolismus




typ metabolismu



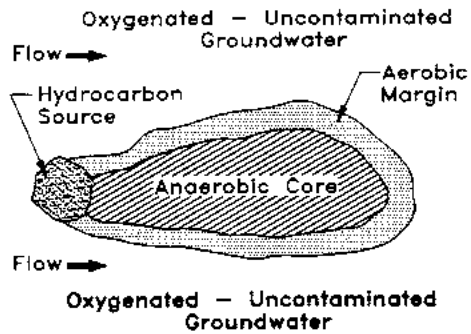
A Typical Hydrocarbon Plume Undergoing Natural Bioremediation;
 (a) Cross Section, (b) Plan View



Legend:

-  Aerobic Margins
-  Residual Phase
-  Anaerobic Core
-  Water Table

(a) Cross Section



(b) Plan View

Přirozená atenuace

1

Podzemní voda proudí

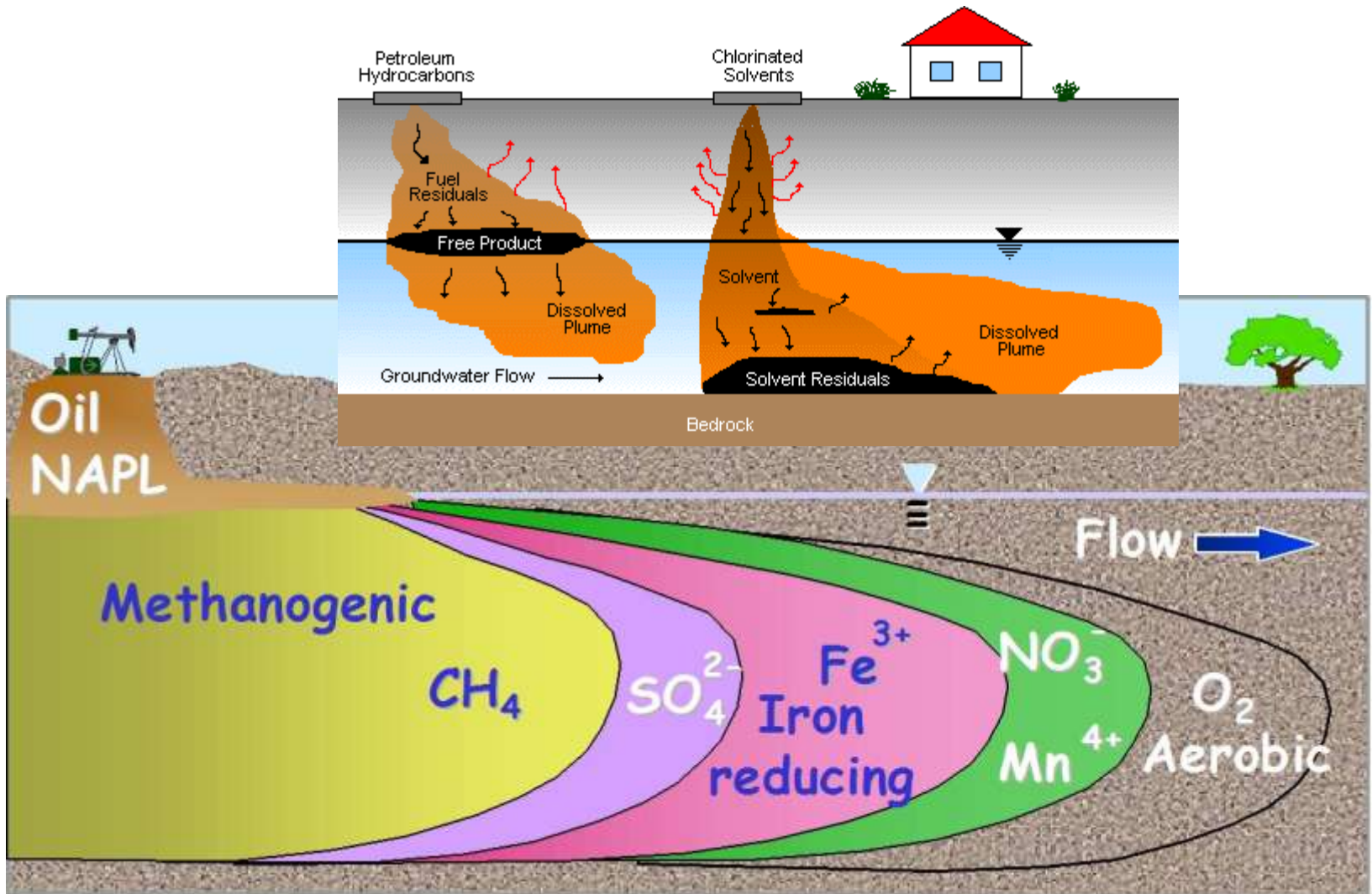
2

Akceptory elektronů

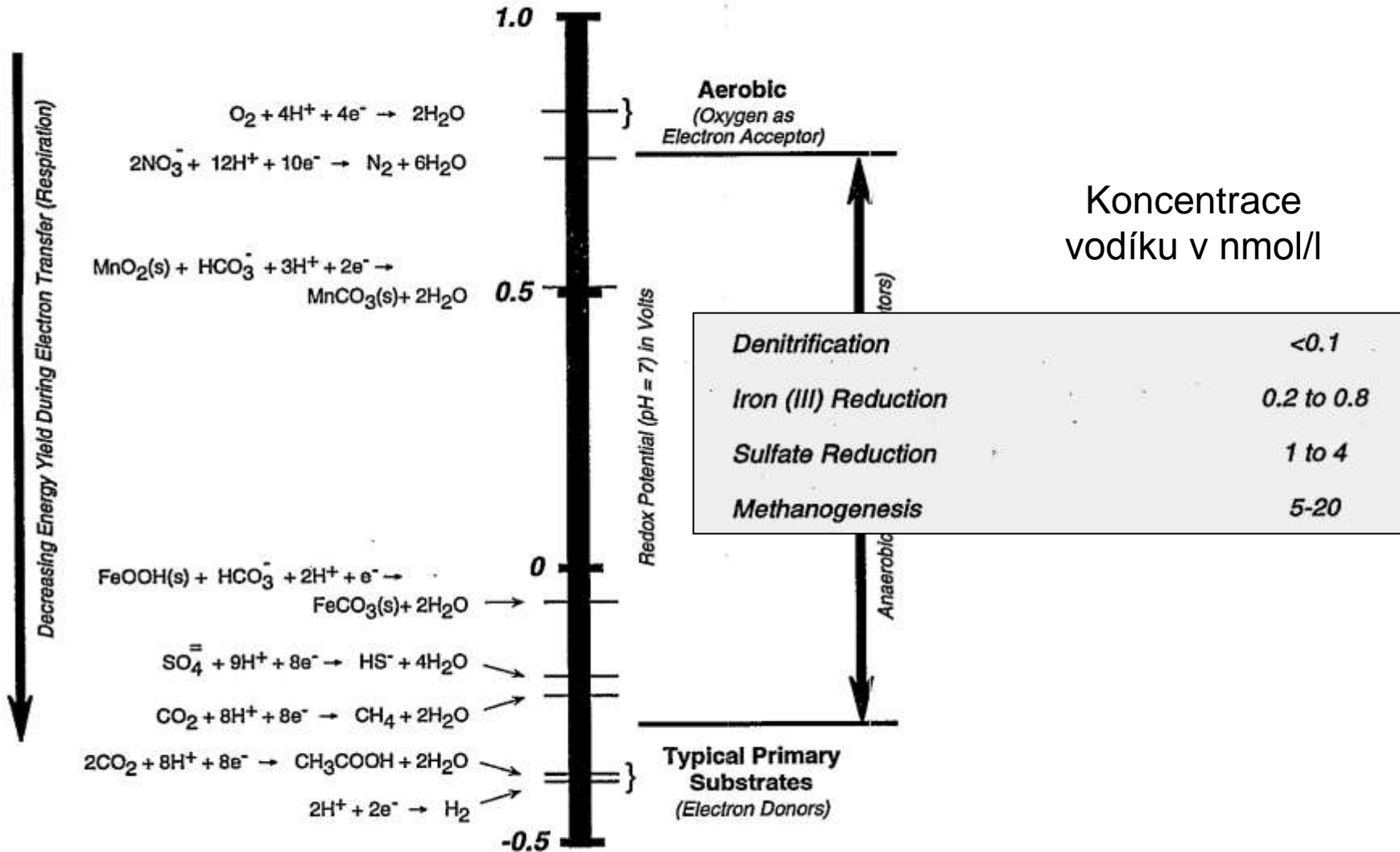
3

Mikroorganismy

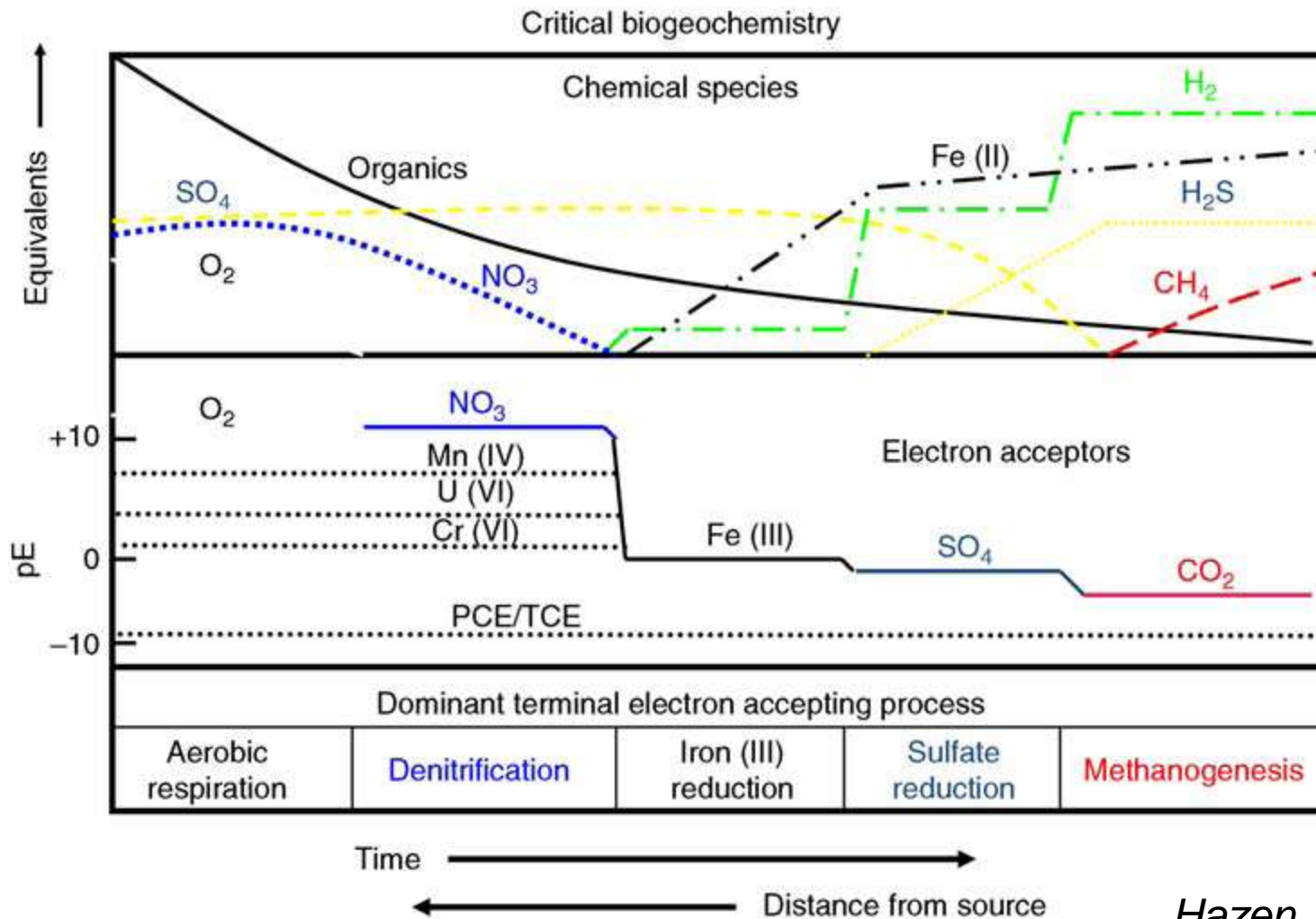




redox potenciál



návrat k přirozené atenuaci



Hazen, 2009

methanogeneze

hydrolýza

acetogeneze

acidogeneze

methanogeneze

sulfátová respirace

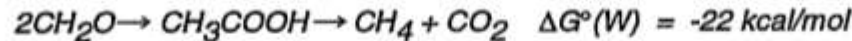
Fe a Mn

denitrifikace

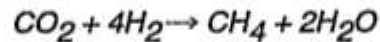
aerobní respirace

řečí chemie...

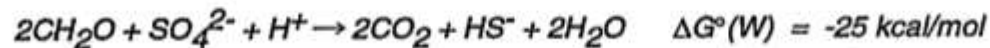
Methanogenic, fermentative:



Note: For organic matter deviating from the used model compound, the fermentation will lead to generation of H₂, which may be oxidized by CO₂ reduction according to:



Sulfate reduction:



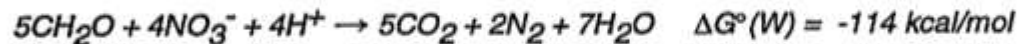
Iron (ferric) reduction:



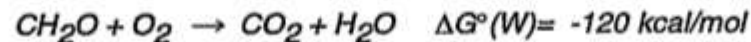
Manganese (manganic) reduction:



Denitrification:



Aerobic respiration, oxygen reduction:



These processes are microbially mediated.

Bioremediation

