

# Comments on Campaner's „On Causal Explanation in the Health Sciences“

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# Campaner's main theses

1. Counterfactuals [in Woodward's sense] do not suffice for explaining [diseases]; they are primarily „heuristic“ devices for identifying those factors that are causally relevant for a disease
2. It is rather *mechanisms* that do the main explanatory work (they provide answers to „how“-questions)
3. Diseases are *multilevel phenomena* (social & genetic); no level is privileged, upper levels are not reducible to lower levels

# Campaner's theses I & II

Thesis I: “Invariant generalizations, describing how a variable might vary were another to be changed by —actual or hypothetical interventions—will not suffice for explanatory purposes” (p. 9)

Thesis II: “counterfactuals can be used to discover what is causally relevant, and mechanical accounts tell us how relevant entities perform their productive activities” (p. 10)

“It is mechanical knowledge which appears to be the ultimate target as far as explanation is concerned” (p. 10)

# Campaner's thesis III

“Epidemiologic explanation in the ecologic perspective we've been considering does not privilege any level, neither low or high, over the other.

Higher levels are not reduc[ible] to lower ones, nor are lower levels explanations regarded as superior to upper level ones, the idea being that it is from an interplay of variables at different levels that diseases originate.” (p.14)

# Challenges

- C1 (thesis I): counterfactuals are sufficient of explanation
- C2 (thesis I&II): mechanisms can be reduced to counterfactuals
- C3 (thesis I): “simple” counterfactuals are insufficient for establishing the causal relevance of causes / components of mechanism
- C4 (thesis III): the concept of *levels of* mechanism may be inappropriate to philosophical analyses of epidemiology

# C1: Explanations in MT

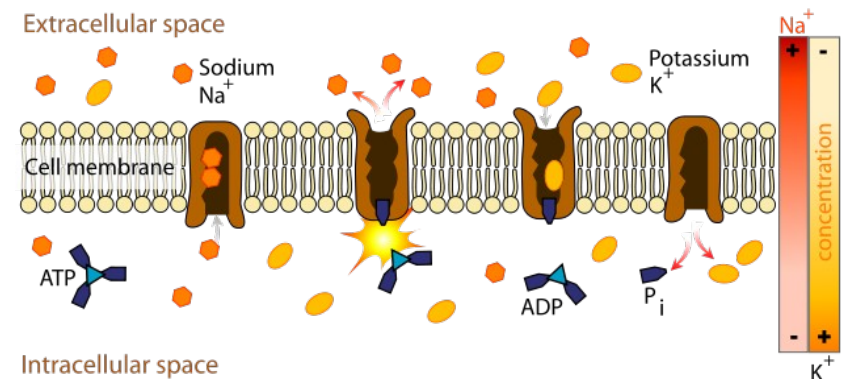
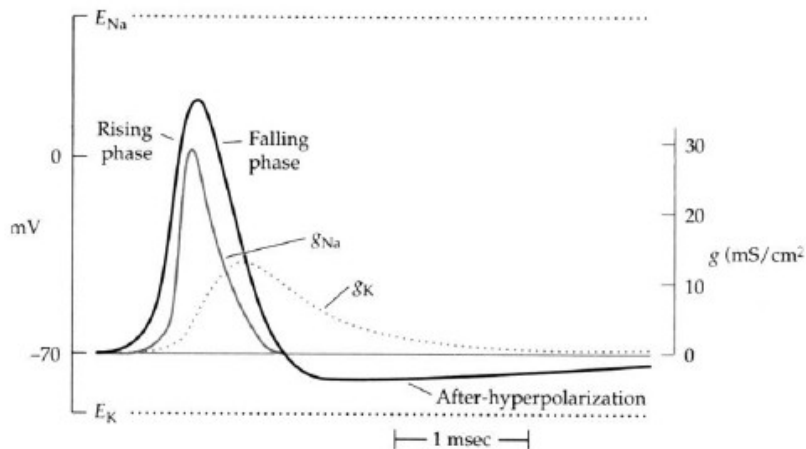
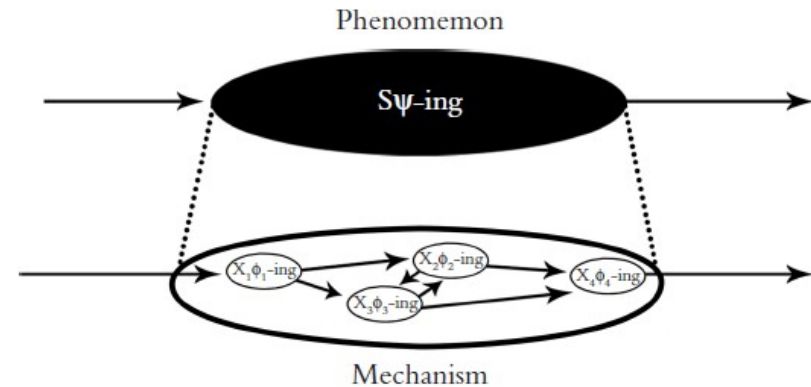
“Explanation has to do with the exhibition of systematic patterns of counterfactual dependence” (Woodward 2000, 210)

Example:

- Explanandum (E): increase in a gas’s pressure  $P$
- Explanans (ES):  $PV=nRT$  (ideal gas law), plus initial conditions  $V=\text{constant}$ ,  $T$  increase by a value of  $x$
- Explanation: not only “derivation” of  $E$  from the ES (cf. DN model) but the ideal gas law also tells us how  $P$  would have changed if we had set  $T$  to another value

# Mechanisms

“Mechanisms are entities and activities organized such that they are *productive* of regular changes from start or set-up to finish or termination conditions.”  
(MDC 2000, 3)

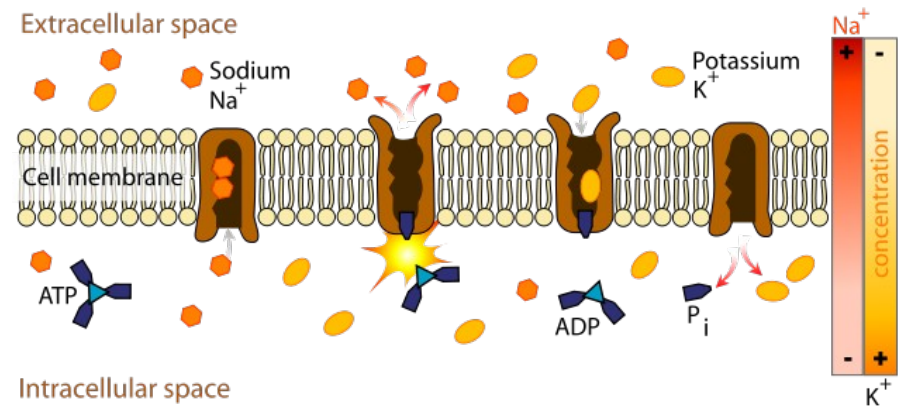
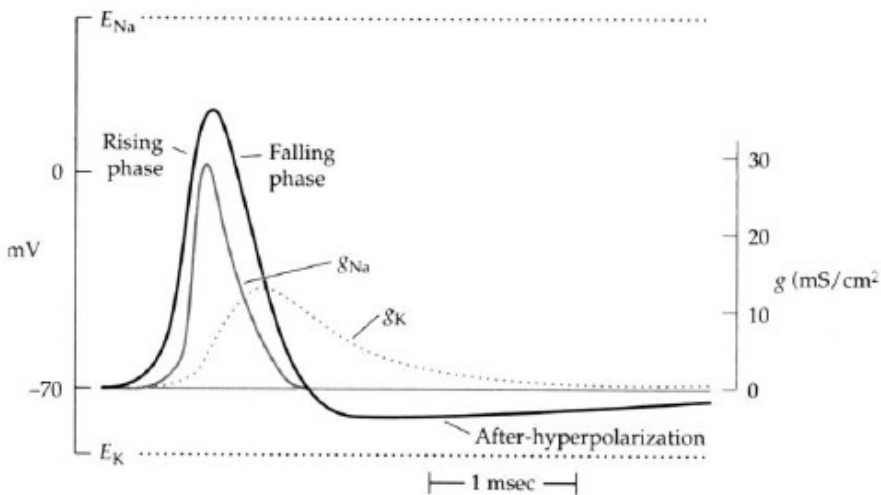


## C2: Mechanisms & MT

- Woodward (2002) has claimed that talk about mechanisms “reduces” to talk about counterfactuals
  - Mechanism M producing phenomenon P is a counterfactual relationship:
    - if there were an intervention that would change the value of mechanism M to M\* (by changing at least one component of M) then the produced phenomenon P would be P\*

# Mechanisms & MT

- MT does not tell us what the components of a mechanism M need to do at what time and in which place in order for M to produce the phenomenon (organization)



# Mechanisms & MT

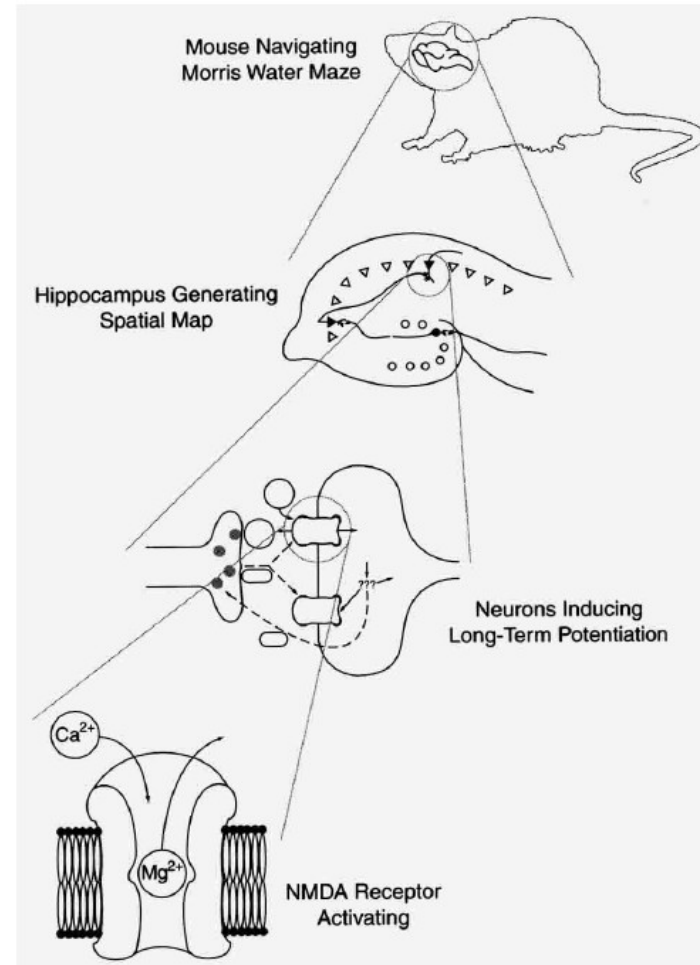
- Of course, one could built into counterfactuals temporal clauses
  - If an intervention  $I$  were to change the value of  $X$  at time  $t$  the value of  $Y$  would change.
- A mechanism could then be described as a set of counterfactuals with a particular temporal order
- Issue: MT is not a reductive causal theory

# C3: Mechanisms & MT

- A “simple” counterfactual notion is not sufficient for identifying causes that are relevant to a mechanism (cf. Craver)
  - Decreasing our heart rate makes a difference to our capacity to complete word-stems (bottom-up);
  - Yet, engaging someone in the task of word-stem completion will not result in a different heart rate (top-down)
- > mutual causal relevance criterion (MM)

# C4: Mechanisms and levels

- Mechanisms are *multi-level* and are *hierarchical*
- Campaner: lower levels (e.g. genes), higher levels (e.g. social, environm. factors)
  - Genetic factors as *constituents* of the social level? Social factors as *constituents* of diseases?
  - In what sense do genetic factors *produce* social factors?



# Conclusion

- None of the above should be understood as an outright rejection of Campaner's position
- Yet, the above does suggest that Campaner should try to make clearer where she stands on the points raised above
  - C1: why are counterfactuals insufficient for explanation?
  - C2: relationship of counterfactuals and mechanisms (Woodward's reducibility claim)
  - C3: relevance of compounds (*mutual* manip. criterion?),
  - C4: *hierarchies* in epidemiology explanations?