**Discussions of erroneous research papers…**  **November 30, 2016**

I) Was the paper on which you reported a description of experiments that were designed to DISPROVE some particular theory?

II) If a theory was tested, could you judge whether that theory was the ACCEPTED PARADIGM, at the time?

III) Did your paper report CONFIRMATION of the theory that seems to have been accepted at the time?

IV) Did your paper consider ONLY ONE HYPOTHESIS? Two hypotheses? Three?

V) Were any observations mentioned for which the authors say they had NO EXPLANATION?

VI) Did your paper disprove a (at that time accepted) hypothesis without proposing an alternative that fit the data?

VII) Have you ever read a scientific paper that disproves (or claims to disprove) an accepted paradigm without proposing an alternative?

VIII) Imagine that someone had suggested whatever explanation has now become accepted (for example: suggesting sliding filaments as a cause of muscle contraction or flagellar bending), do you think your author might have accepted the new idea? (Can you imagine them saying "Oh, of course! Why didn't I think of that? ")

VI) Do there seem to have been two competing theories at the time your paper was written? Did they differ in detail? Or were they so fundamentally different that advocates of one might be unable to understand the other? *(Linus Pauling regarded the Watson & Crick paper as unimportant, and never understood the Clonal Selection Hypothesis)*

VII) Have you ever read something about such a dispute between mutually incomprehensible theories?

VIII) Could you have designed better experiments than those described in the paper on which you reported?

IX) A BETTER EXPERIMENT means what? More conclusive? More persuasive? Simpler? Cheaper? More Dramatic? More practical for others to replicate?

X) Have you changed your own personal opinions about research as a result of this erroneous paper report? Do you read papers more critically? (Looking for mistakes?) Did it encourage you toward a research career?

XI) Please consider the widely believed idea that cancer chemotherapy works by slowing down the growth of cancer cells. ("growth" being used to mean mitosis and DNA synthesis; not meaning enlargement in size.)

XII) Did you (do you?) believe this really is how chemotherapy works?

XIII) Do you (did you previously?) accept this explanation for chemotherapy based on logical necessity?

XIV) Is it supported by evidence?

XV) What specific evidence?

\* Because so many anti-cancer drugs really do block DNA synthesis?

\* Because faster growing cancers tend to have higher cure rates?

\* Because chemotherapy is especially damaging to those tissues that are faster growing?

\* What other evidence?

XVI) How does the immune system reject organ grafts? By detecting that the grafts are not self? Something else?

XVII) Is there an evolutionary adaptive function for being able to distinguish whether a cell is foreign or self? Is graft rejection an unfortunate result of mechanisms that evolved to resist infection by germs?

XVIII) Are grafts rejected because the body has lymphocytes whose binding sites fit molecules of the graft?

XIX) Does rejection occur because the tolerance mechanism doesn't weed out lymphocytes unless their binding sites fit some self molecules?

XX The theory that immunity works by distinguishing self from non-self is… (which?)

… is a fundamental concept that biologists need to be taught?

… is a description that sounds like an explanation?

… something else?

XXI) When cancer cells **die as a result of Coley's toxin, do they die by apoptosis?** Or by necrosis?

None of the articles mention this? Did you find any?

Apoptosis hadn't yet been discovered during Coley's lifetime?

(What about programmed cell death?)

What does it matter, as long as the cancer cells die?

The answer to this question is important for understanding and improving Coley's toxins?

XXII) Which of these should be the higher priority of cancer research (and research about autoimmune diseases?)

Finding methods to repress the symptoms? (… and prolong lives)

Finding permanent cures?

Finding treatments that would legally be patentable?

Understanding basic mechanisms?

XXIII) Which of the above gets highest priority?

XXIV) By what changes in laws could incentives be increased to encourage discovery of new cures?

XXV) Did the section about "chaos theory" interest you, at all? Did it help you understand any biological phenomena?