# Producible protein (fixed-angle) chains

[Demaine, Langerman, O'Rourke 2003]

6.885
L17.1
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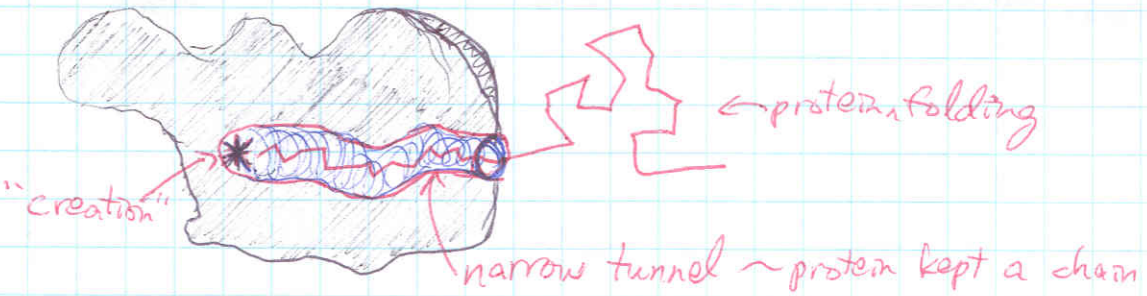
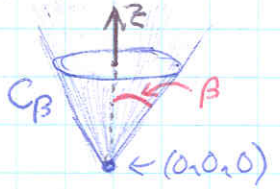
**Ribosome** = collection of proteins & some RNA translating messenger RNA into proteins

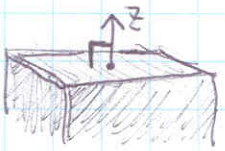



**β-producible chain**: (crude) geometric model of chains/configs. resulting from ribosome

- cone $C_\beta$ of half-angle $\beta$
  - convention: apex @ origin
    axis = positive z




- chain produced in the cone, one link at a time
- emanates from apex of cone
- once a vertex reaches the apex, it can never re-enter cone
  (once an edge exits the cone, it can never re-enter)
- most flexible model: next vertex ($v_{i+1}$) & link produced ($(v_i, v_{i+1})$)
  precisely when last vertex $v_i$ reaches apex of cone
- more formally: at time $i$, $v_i$ is at apex of cone
  $v_{i+1}$ is produced (as is $(v_i, v_{i+1})$)

  at time $\geq i$, $v_{\geq i}$ cannot enter cone
  at time between $i$ & $i+1$,
  $(v_i, v_{i+1})$ passes through origin
  $v_{i+1}$ is inside cone

**Reality**: $\beta = 90°$ (halfspace) is closest model