

MYCIN

- Diagnoses and prescribes treatment for infectious diseases
- Uses backward chaining with 500 rules

```
defrule 73
  if (site culture is blood)
    (gram organism is neg)
    (morphology organism is rod)
    (aerobicity organism is anaerobic)
  then .9
    (identity organism is bacteroides))
```

```
(defrule 75
  if (gram organism is neg)
    (morphology organism is rod)
    (compromised-host patient is yes)
  then .6
    (identity organism is pseudomonas))
```

```
(defrule 107
  if (gram organism is neg)
    (morphology organism is rod)
    (aerobicity organism is aerobic)
  then .8
    (identity organism is
      enterobacteriaceae))

(defrule 165
  if (gram organism is pos)
    (morphology organism is coccus)
    (growth-conformation organism is
      chains)
  then .7
    (identity organism is streptococcus))
```

Metarules

If The infection is pelvic-abscess
AND There are rules that mention in their
 premise Enterobacteriaceae
AND There are rules that mention in their
 premise gram positive rods
THEN There is suggestive evidence that the
 rules dealing with Enterobacteriaceae
 should be invoked before those dealing
 with gram positive rods

Evaluation

Blind evaluation of prescriptions from MYCIN and 9 other providers, for 10 real cases.

Prescriber	% Acceptable	Pathogen missed
MYCIN	70	0
Prior Rx	70	0
Faculty-4	50	0
Faculty-1	50	1
Faculty-2	50	1
Fellow	50	1
Faculty-3	40	0
Faculty-5	30	0
Resident	30	1
Student	10	3

Lessons

1. “In the knowledge is the power”—with simple control it can match human experts
2. Explanation and clear reasoning paths are important to the experts
3. Backwards chaining helps clarify the path (but pure top-down is a problem)
4. Rules are easily added
5. Separation of knowledge from control permits use for other applications
6. Meta-rules can improve search control