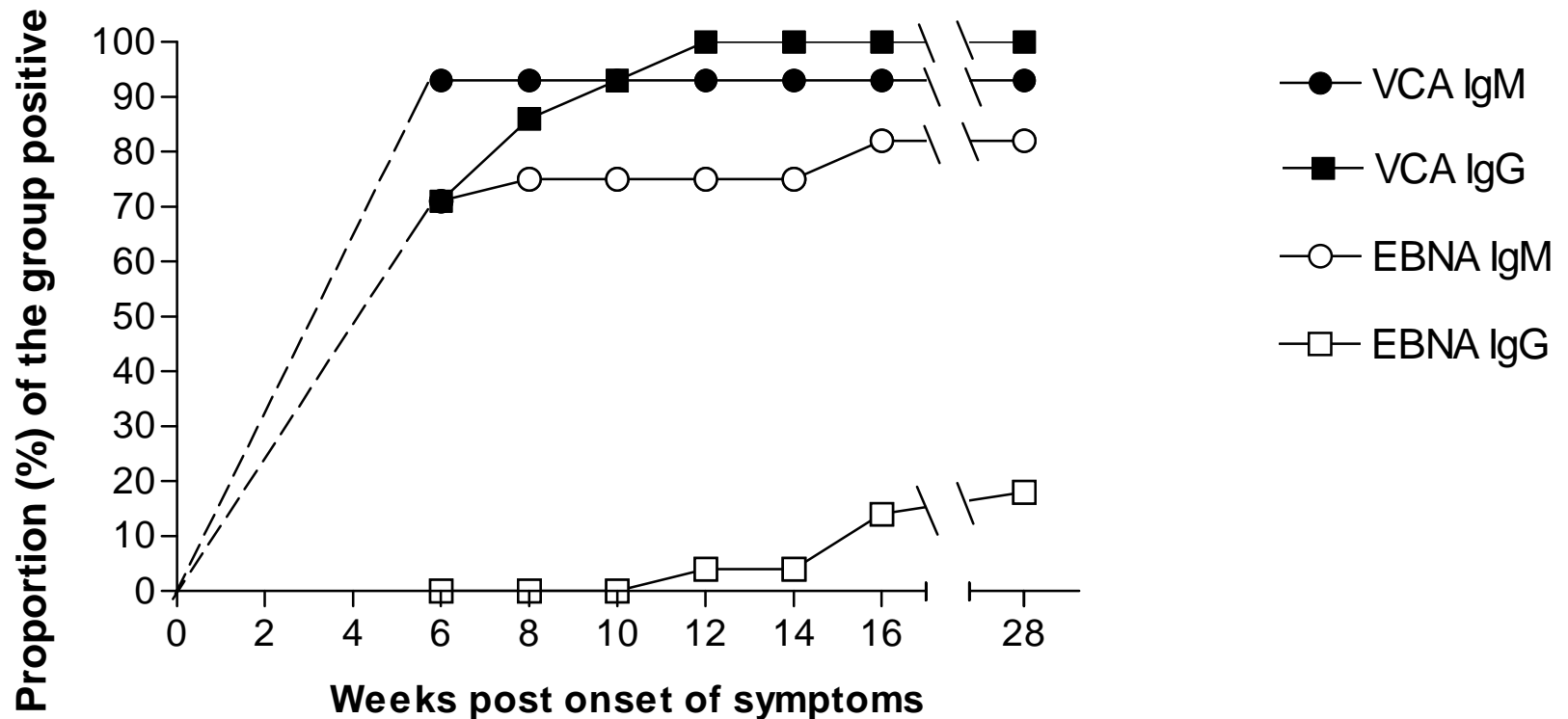# EBV serology

- Present serological methods for diagnosis of primary EBV:
  High sensitivity, low cost, high throughput
  Poor differentiation between primary infection and reactivation (single sample)

- Dubbo study: 28 well characterised EBV cases

- Specificity: 30 cases previous EBV & recent HIV, CMV or Hepatitis A (FP EBV serology)

The Dubbo Cohort Study
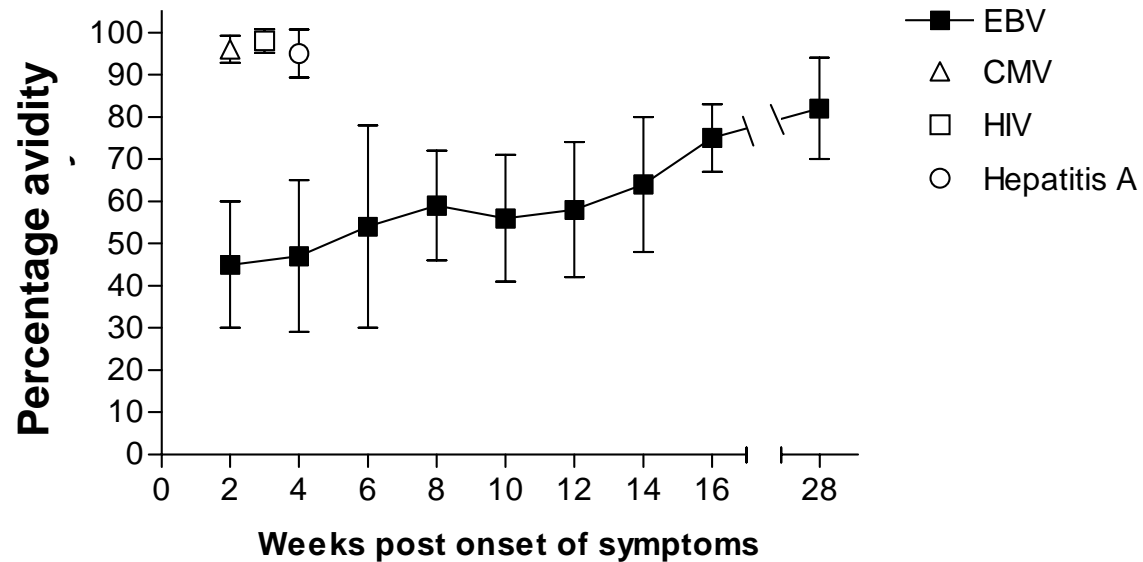
Serological responses

The Dubbo Cohort Study

Serological responses (IgG VCA avidity)

EBV

Percentage avidity vs. Weeks post onset of symptoms

Legend:
- ■ EBV
- △ CMV
- □ HIV
- ○ Hepatitis A

Number of samples
from EBV cases tested: n = 7   15   22   17   13   5   2   5   4

The Dubbo Cohort Study

Serological responses (IgG VCA avidity)

	Sample size (n)	Number (%) of group with positive serology VCA		EBNA		IgG VCA avidity (mean % and SD)
		IgG	IgM	IgG	IgM	
Hep A	15	15 (100)	12 (80)	15 (100)	12 (80)	95 (5.7)
HIV	14	14 (100)	5 (36)	14 (100)	10 (71)	98 (2.8)
CMV	6	6 (100)	1 (16)	6 (100)	6 (100)	96 (3.2)
Combined	35	35 (100)	18 (51)	35 (100)	28 (80)	96.3 (4.4)

EBV summary

VCA-IgM antibody appears in both primary infection & reactivation of EBV.

VCA IgG (gp125)antibody appears early in primary infection and should last for life.

Low avidity IgG antibody only appears in primary EBV infection & increases to approx 80% by 6 months.

EBNA IgG antibody appears after about 6 months & should last for life.

The combination of low VCA IgG avidity with positive VCA IgM & negative EBNA IgG is 100% specific for the diagnosis of primary EBV infection.

VCA IgG (gp125) & EBNA IgG

Age 2 - 50 yrs (n=3317)

		VCA IgG	
		+	-
EBNA	+	59%	6%
IgG	-	11%	24%

VCA IgG(gp125) & EBNA IgG[2]

Age 10 - 20yrs (n=552)

		VCA IgG	
		+	-
EBNA	+	53%	6%
IgG	-	15%	26%

VCA IgG (gp125) & EBNA IgG

Age > 50 yrs (n=747)

VCA IgG[1]

		+	-
EBNA	+	76%	11%
IgG	-	8%	5%

EBNA-1 IgG

Up to 6% of infections never develop EBNA-1 IgG antibody (higher in immunocompromised) (Bauer 1994)

EBV Viral capsid antigen

A complex of at least 7 proteins and glycoproteins.

Incl.

gp125 - major capsid immunogen

p18 - immunodominant tegument (18kDa) protein.

Anti-VCA p18 IgG antibody

- Found in 'most' EBV carriers-(Wout 1993)
- A late marker of EBV infection.(Hinderer 1999)
- Not lost during immunosuppression (Bauer 2001)
- Does not appear to have sequence homologues to other human herpesviruses

Previous EBV Infection

53 Samples

VCA gp125 Negative / EBNA IgG Positive

gp125 IgG	p18 IgG	No
Neg	Pos	52
Neg	Neg	1

Anti EBV VCA p18 in recent infection

VCA IgM pos / EBNA IgG neg (n=32)

12/32 anti p18 neg.

VCA IgM pos / EBNA IgG neg/Avidity<60%. (n=12)

5/12 anti p18 neg.

Conclusions:

- EBV VCA p18 IgG EIA appears more sensitive than EBV VCA gp125 IgG EIA

  (except early acute EBV)

- EBV VCA p18 IgG EIA agrees better than EBV VCA gp125 IgG EIA with EBNA IgG EIA (52/53)

- EBV VCA p18 IgG useful to assist in the determination of EBV immune status