Performance of two new fully automated immunoassay panels (ARCHITECT and BioPlex® 2200 New EBV IgG) for the determination of Epstein-Barr Virus serological status

T.D Ly, C Coignard, C Marcenaro (Biomnis, Ivry sur Seine, France)

OBJECTIVES

The performance of 2 new EBV assay panels on two automated instruments, namely, **Abbott ARCHITECT EBV** (*Abbott, Delkenheim, Germany*) with individual assays for **VCA IgG, VCA IgM and EBNA-1IgG** and **Bio-Rad's BioPlex® EBV** (*Bio-Rad, Marnes la Coquette, France*) multiplex assay with separate modules for **New EBV IgG** (simultaneous detection of VCA IgG, EA IgG, EBNA IgG) **and EBV IgM** (simultaneous detection of VCA IgM and EA)was compared to that of **LIAISON® VCA IgG, EBV IgM and EBNA IgG** (*DiaSorin, Saluggia, Italy*) routinely used in our laboratory.

MATERIALS AND METHODS

462 unselected serum samples, submitted to the laboratory for EBV serological testing, were run in parallel by all three analyzers. Based on the results of the individual assays, the serological status of the EBV infection was classified into one of the following five categories (table I) according to the interpretations given by the manufacturers.

Table I. Interpretation rules applied for the serologic EBV status in this evaluation

Serological EVB status			EBV interpretation in this evaluation
ARCHITECT	BioPlex® 2200	LIAISON®	
Negative	Negative	Negative	Seronegative
Early acute	Primary Acute	Early acute	Primary infection
Acute		Acute	
Transient infection	Late acute	Transient infection	Past infection
Past infection	Recovering	Past infection	
	Past infection		
Isolated VCA IgG	Isolated VCA IgG	Isolated VCA IgG	Isolated VCA IgG
Isolated EBNA IgG	Isolated EBNA IgG	Isolated EBNA IgG	Isolated EBNA IgG

In case of discordant serostatus, Mikrogen recomLine EBV IgM/IgG immunoblots (Mikrogen, Neuried, Germany) were used to resolve discrepancies.

RESULTS

The following Tables (II, III and IV) show the comparison of serologic EBV status of 462 samples. Overall agreement for determination of the EBV serostatus, including (or not) the isolated VCA IgG and EBNA IgG, was 93.3% (94.9%) between ARCHITECT and LIAISON®, 90% (94.4%) between BioPlex® and LIAISON®, and 91.6% (96.5%) between BioPlex® and ARCHITECT.

Concordance between EBV status of ARCHITECT and LIAISON®

Table II. Correlation between results status of ARCHITECT and LIAISON® in 462 routine samples.

		LIAISON®					
		Seronegative	Primary inf	Past inf	Isolated VCA	Isolated EBNA	Total
ARCHITECT	Seronegative	79	4	0	0	0	83
	Primary Infection	2	72	1	0	0	75
	Past infection	1	1	257	4	5	268
	Isolated VCA IgG	7	3	2	23	0	35
	Isolated EBNA IgG	1	0	0	0	0	1
	Total	90	80	260	27	5	462

Percent Agreement: Seronegative: 87.8% (79/90); Primary infection: 90% (72/80); Past infection: 98.8% (257/260)

By Immunoblot:

- 11 of 90 (12.2%) samples referenced as Seronegative by LIAISON were found 8 Seronegative, 1 Isolated VCA IgG and 2 Past infection.
- 8 of 80 (10%) samples referenced as Primary infections by LIAISON were found 4 Seronegative, 3 Isolated VCA IgG and 1 Past infection.
- 3 of 75 (4%) samples referenced as Primary infections by ARCHITECT were found 2 Seronegative and 1 Past infection.
- 5 of 5 (100%) samples referenced as Isolated EBNA IgG by LIAISON were found 5 Past infection by ARCHITECT and Immunoblot
- 7 of 35 (20%) samples referenced as Isolated VCA IgG by ARCHITECT and Seronegative by LIAISON were found 6 Seronegative.

Concordance between EBV status of BioPlex® 2200 and LIAISON®

Table III. Correlation between results status of BioPlex® and LIAISON® in 462 routine samples

		LIAISON®					
		Seronegative	Primary inf	Past inf	Isolated VCA	Isolated EBNA	Total
BioPlex® 2200	Seronegative	84	9	0	0	0	93
	Primary Infection	1	65	2	0	0	68
	Past infection	1	4	257	17	5	284
	Isolated VCA IgG	1	2	1	10	0	14
	Isolated EBNA IgG	3	0	0	0	0	3
	Total	90	80	260	27	5	462

Percent Agreement: Seronegative: 93.3% (84/90); Primary infection: 81.3% (65/80); Past infection: 98.8% (257/260)

By Immunoblot:

- 15 of 80 (18.8%) samples referenced as Primary infections by LIAISON were found 1 Primary infection, 9 Seronegative, 4 Isolated VCA IgG and 1 Past infection.
- 3 of 68 (4.4%) samples referenced as Primary infections by BioPlex® were found 1 Seronegative, 1 Isolated VCA IgG and 1 Past infection.
- 5 of 5 (100%) samples referenced as Isolated EBNA IgG by LIAISON were found 5 Past infection by BioPlex® and Immunoblot.
- 3 of 3 (100%) samples referenced as Isolated EBNA IgG by BioPlex® were found 2 Past infection and 1 Isolated VCA IgG

Concordance between EBV status of BioPlex® 2200 and ARCHITECT

Table IV. Correlation between results status of BioPlex® and ARCHITECT in 462 routine samples

		ARCHITECT					
		Seronegative	Primary inf	Past inf	Isolated VCA	Isolated EBNA	Total
BioPlex® 2200	Seronegative	81	5	0	7	0	93
	Primary Infection	0	66	2	0	0	68
	Past infection	0	3	264	17	0	284
	Isolated VCA IgG	1	1	1	11	0	14
	Isolated EBNA IgG	1	0	1	0	1	3
	Total	83	75	268	35	1	462

Percent Agreement: Seronegative: 97.6% (81/83); Primary infection: 88% (66/75); Past infection: 98.5% (264/268)

By Immunoblot:

- 9 of 75 (12%) samples referenced as Primary infections by ARCHITECT were found 1 Primary infection, 7 Seronegative and 1 Past infection.
- 2 of 68 (2.9%) samples referenced as Primary infections by BioPlex® were found 1 Isolated VCA IgG and 1 Past infection.
- All 7 of 35 (20%) samples referenced as Isolated VCA IgG by ARCHITECT and Seronegative by BioPlex® were found Seronegative.

Evaluation of assays for VCA IgG in EBV primary infection

Among 65 Primary infection samples (identified by all 3 assays), 15 samples (23.1%), 21 samples (32.3%), 56 samples (86.2%) and 47 samples (72.3%) were VCA IgG negative with ARCHITECT, LIAISON® , Current BioPlex® and New BioPlex® respectively (Table V).

Table V. Number VCA IgG negative samples in 65 EBV primary infections.

65 EBV primary infections	ARCHITECT	LIAISON®	Current IgG BioPlex®	New IgG BioPlex®
	VCA IgG	VCA IgG	VCA IgG	VCA IgG
Negative samples	15	21	56	47
% negative	23.1	32.3	86.2	72.3

The agreement with ARCHITECT and BioPlex® compared to LIAISON® was 90% and 81.3% for Primary infections and 87.8% and 93.3% for Seronegative profile. Both ARCHITECT and BioPlex® showed good concordance with LIAISON® in 98.8% for detection of Past infections. In addition, concordance of Seronegative and Past infection status was 97.6% and 98.5% between BioPlex® and ARCHITECT.

In this study, Isolated VCA IgG cases were detected in 3%, 5.8% and 7.6% of cases with BioPlex®, LIAISON® and ARCHITECT, respectively, while isolated EBNA IgG cases were reported in 0.2 %, 0.6%, 1.1%, and of cases with the ARCHITECT, BioPlex®, and LIAISON® assays respectively.

According to LIAISON® more samples were determined with a primary infection profile (80 samples) than with ARCHITECT (75 samples) and BioPlex® (68 samples). Among them, the number of discrepancies was respectively 15 for LIAISON® (1/15 confirmed by WB), 10 for ARCHITECT (1/10 confirmed by WB) and 3 for BioPlex® (0/3 confirmed by WB). Six seronegative samples were classified as isolated VCA IgG by ARCHITECT, 5 past infection samples were classified as isolated EBNA by LIAISON® and 12 isolated VCA samples were classified past infection by BioPlex®.

CONCLUSIONS

Good overall agreement of › 90% was found between all three systems, and an even better concordance in cases of past EBV infections (98.8%).

An isolated VCA IgM with LIAISON® and ARCHITECT should be cautiously interpreted in conjunction with clinical manifestations and hematological findings and a follow-up sample should be taken in case of possible a primary infection.

VCA IgG of BioPlex® New EBV IgG appears later than VCA IgG of ARCHITECT and LIAISON® during the primary infection.

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