

**To:** ivan.bottoli [REDACTED]  
**From:** Elizabeth Holmes [/O=Theranos Organization/OU=First Administrative Group/CN=Recipients/CN=EHolmes]  
**Sent:** Fri 7/4/2008 11:16:25 PM (UTC)  
**Subject:** RE: apologies!!!  
[Theranos Novartis Bone Study Inflammation Report.pdf](#)

Ivan.

I have attached the completed validation study report showing Theranos' ability to run a multiplexed cartridge (customized for IL-6, TNF-a, hsCRP, and CRP) and get the same (in some cases better) results than PBI, which Novartis used for their Reclast study. The PBI tests were not multiplexed and have higher limits of detection than Theranos.

Please forward to whoever needed; note pages 6-8 – the data speaks for itself.

Elizabeth.

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**From:** ivan.bottoli [REDACTED]  
**Sent:** Sunday, June 22, 2008 9:35 AM  
**To:** Elizabeth Holmes  
**Subject:** Re: apologies!!!

Hi Elizabeth  
I'll be on vacation.  
However, happy to chat if you call me

Ivan

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----- Original Message -----

**From:** "Elizabeth Holmes" [eholmes@theranos.com]  
**Sent:** 06/21/2008 09:23 PM MST  
**To:** Ivan Bottoli  
**Subject:** RE: apologies!!!

Ivan –  
Hope you're well. I know you and Susan have been corresponding; I will be in NJ on Tuesday and would very much like to connect with you. Let me know if there's a convenient time for you to meet that day.  
Looking forward to it,  
Elizabeth.

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**From:** ivan.bottoli [REDACTED]  
**Sent:** Thursday, April 17, 2008 2:36 PM  
**To:** Elizabeth Holmes  
**Subject:** apologies!!!

Hi Elizabeth,  
First of all I would like to apologize for not getting back to you. Just a simple reason: I forgot!  
Your admin indicated that you are traveling tomorrow so that we won't be able to connect until next week. However, feel free to call me on my cell any time: just don't leave messages on it because I get them days later sometimes!!

Talk to you soon

Ivan

Ivan Bottoli  
NIC002 GPMD a.i.  
Global Clinical Development  
Novartis Pharmaceuticals

HOLMES0019233



## **Summary Report: Novartis Bone Study**

### **Summary of Study:**

- Small amounts of a statistically significant number of blinded archived plasma samples from a Reclast study were sent to Theranos and run on Theranos Systems.
- Information provided to Theranos:
  - sample ID
  - patient initials
  - time points (0, 24 and 72 hours).
- Each sample was run on a multiplexed cartridge customized to run IL-6, CRP, hsCRP, and TNF- $\alpha$  simultaneously across a broad dynamic range.
- Results were summarized in excel and sent back; Novartis shared their results from PBI (a current 'gold standard').

### **Background on the Theranos System:**

- Theranos is a fully integrated point-of-care system designed to work remotely and wirelessly transmit results from a finger-stick of fresh whole blood or assays run on plasma or serum.
- Up to 6 assays are run simultaneously in a multiplex on a single cartridge with on-board controls (the gold standard used by Novartis in this study is not a multiplex and requires considerable amount of sample for each assay).
- Theranos IL-6, TNF- $\alpha$  and CRP assays cover the entire range for high sensitivity and regular sensitivity in one assay system, no need for multiple kits or dilutions.
- Theranos limit of detection is lower than comparable methods.
  - IL-6 average LOD = 0.2 pg/mL, range = 0.2 pg/mL to 1500 pg/mL
  - TNF- $\alpha$  average LOD = 0.65 pg/mL, range = 0.65 pg/mL to 15,000 pg/mL
  - CRP average LOD = 0.06 ug/mL, range = 0.06 ug/mL to 250 ug/mL
- Theranos systems are factory calibrated, no standard curves or in-house calculations are required.
- Theranos systems can be calibrated to Novartis' gold-standard and predicate results using the present data if desirable (the system was calibrated to different standards than Novartis used for this study).

**Summary of Results from Theranos Systems and PBI**

| Barcode #  | Initials | Visit (HR) | Theranos |        |       | PBI    |        |       |
|------------|----------|------------|----------|--------|-------|--------|--------|-------|
|            |          |            | pg/mL    | pg/mL  | ug/mL | pg/mL  | pg/mL  | ug/mL |
|            |          |            | [IL-6]   | [TNFa] | [CRP] | [IL-6] | [TNFa] | [CRP] |
| A5673052-6 | DMC      | 72         | 1.0      | 1.8    | 45.8  | 1.5    | 3.1    | 39.1  |
| A5673206-6 | NLL      | 0          | 0.8      | 0.8    | 0.1   | 1.3    | 1.9    | 0.4   |
| A5673050-6 | DMC      | 0          | 0.8      | 1.1    | 4.3   | 1.1    | 2.2    | 3.1   |
| A5673051-6 | DMC      | 24         | 14.3     | 5.3    | 41.0  | 22.6   | 8.7    | 40.2  |
| A5673207-6 | NLL      | 24         | 1.8      | 1.2    | 0.1   | 2.6    | 1.7    | 0.4   |
| A5673208-6 | NLL      | 72         | 0.5      | 0.8    | 0.1   | 3.3    | 1.8    | 0.4   |
| A5803961-6 | 00011    | 0          | 1.5      | 0.9    | 11.6  | 2.1    | 2.8    | 13.2  |
| A5803962-6 | 00011    | 24         | 67.7     | 5.1    | 56.9  | 116.6  | 7.6    | 80.8  |
| A5851956-6 | 00011    | 72         | 1.9      | 3.0    | 70.2  | 3.7    | NES*   | 89.0  |
| A5851956-6 | JCB      | 24         | 14.7     | 2.8    | 28.8  | 28.1   | 4.3    | 24.7  |
| A5851957-6 | JCB      | 72         | 1.4      | 1.1    | 23.1  | 2.8    | 2.3    | 32.6  |
| A5851955-6 | JCB      | 0          | 1.1      | OOO**  | 0.8   | 2.1    | 1.3    | 0.8   |
| A5980440-6 | NLS      | 0          | 2.7      | 0.9    | 4.7   | 6.3    | 1.6    | 3.4   |
| A5980441-6 | NLS      | 24         | 26.7     | 2.5    | 18.8  | 51.5   | 5.1    | 17.6  |
| A5980442-6 | NLS      | 72         | 3.4      | 1.9    | 83.6  | 7.5    | 3.6    | 82.7  |
| A5673154-6 | SJS      | 0          | 0.8      | 0.8    | 0.7   | 2.0    | 1.5    | 0.9   |
| A5673155-6 | SJS      | 24         | 1.5      | 0.6    | 1.3   | 2.4    | 1.9    | 0.9   |
| A5673156-6 | SJS      | 72         | 2.1      | 2.4    | 8.3   | 4.8    | 1.7    | 6.9   |
| A5803964-6 | SSP      | 0          | 1.1      | 2.6    | 9.9   | 2.1    | 1.8    | 11.0  |
| A5803965-6 | SSP      | 24         | 53.5     | 8.9    | 49.9  | 70.0   | 9.0    | 76.8  |
| A5803966-6 | SSP      | 72         | 1.5      | 2.8    | 59.8  | 2.8    | 4.2    | 69.5  |
| A5673232-6 | GAB      | 0          | 3.8      | 1.9    | 1.0   | 2.8    | 2.8    | 0.9   |
| A5673233-6 | GAB      | 24         | 68.3     | 7.1    | 25.5  | 79.4   | 10.3   | 24.7  |
| A5673234-6 | GAB      | 72         | 3.4      | 3.9    | 34.7  | 2.1    | 4.4    | 26.8  |
| A5673462-6 | GAS      | 0          | 0.7      | 1.9    | 1.6   | 1.0    | 1.3    | 1.3   |
| A5673463-6 | GAS      | 24         | 11.5     | 3.1    | 16.4  | 18.6   | 2.9    | 20.0  |
| A5673464-6 | GAS      | 72         | 4.0      | 2.0    | 60.7  | 7.2    | 2.9    | 56.2  |
| A5673091-6 | MAD      | 0          | 1.1      | 7.9    | 5.2   | 1.7    | 2.1    | 4.6   |
| A5673092-6 | MAD      | 24         | 23.1     | 14.9   | 33.3  | 37.3   | 9.1    | 45.9  |
| A5673093-6 | MAD      | 72         | 4.3      | 12.9   | 102.2 | 5.3    | 4.7    | 75.4  |

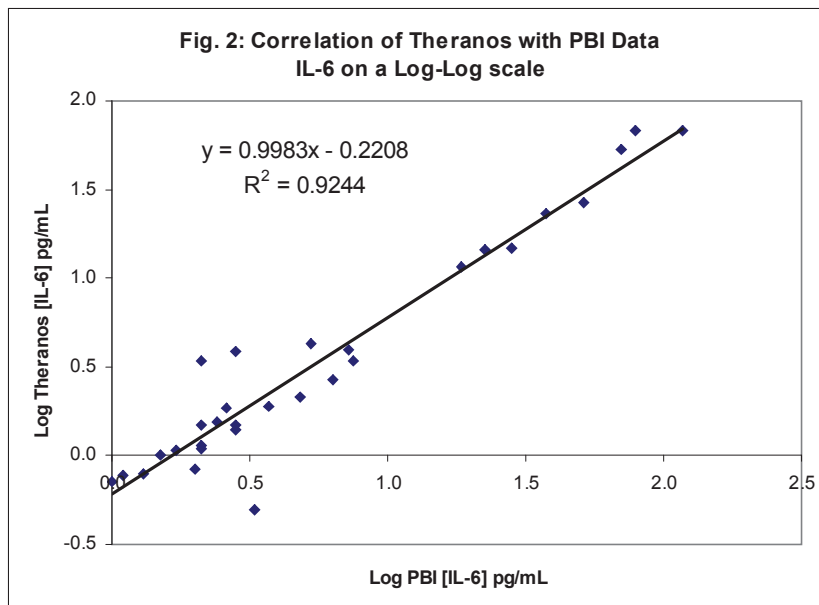
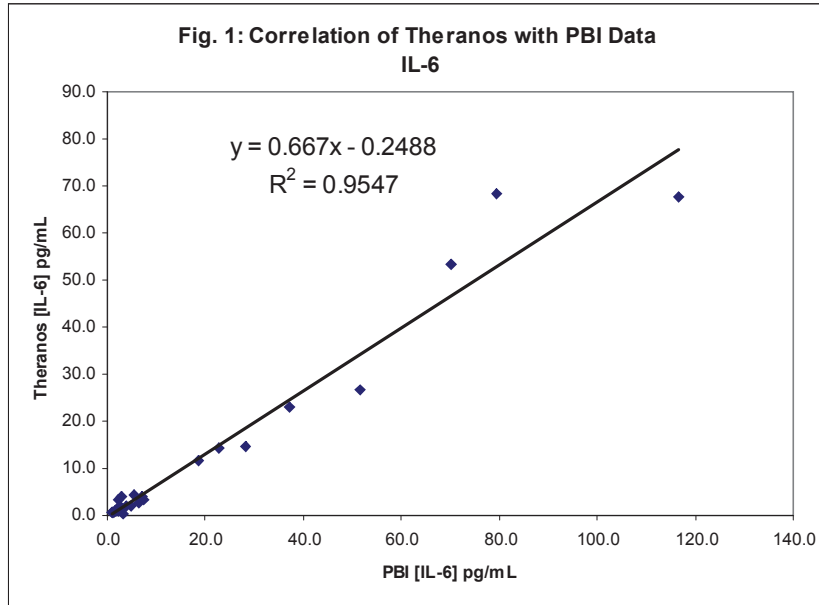
\* NES = Not Enough Sample

\*\* OOR = Out of Range (Low)

## Analysis of Data

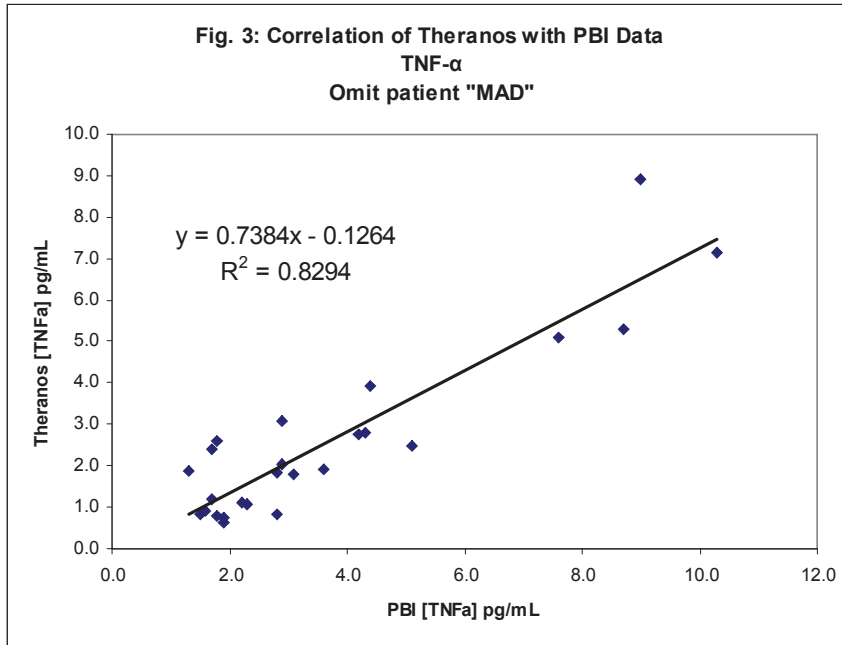
### Correlation of IL-6 data from Theranos Systems and PBI

- Correlation between Theranos and PBI results was high (Fig. 1)
- Since the samples spanned a wide range, a log-log plot was used to analyze the correlation across the range of the assay – correlation on the log-log plot was also high (Fig. 2).



Correlation of TNF- $\alpha$  data from Theranos Systems and PBI

- Correlation between Theranos and PBI results was high (Fig. 3).
- TNF- $\alpha$  values for 90% of samples were less than 5 pg/mL.



Correlation of CRP data from Theranos Systems and PBI

- Correlation between Theranos and PBI results was high (Fig. 4).
- Since the samples spanned a wide range, a log-log plot was used to analyze the correlation across the range of the assay – correlation on the log-log plot was also high (Fig. 5).

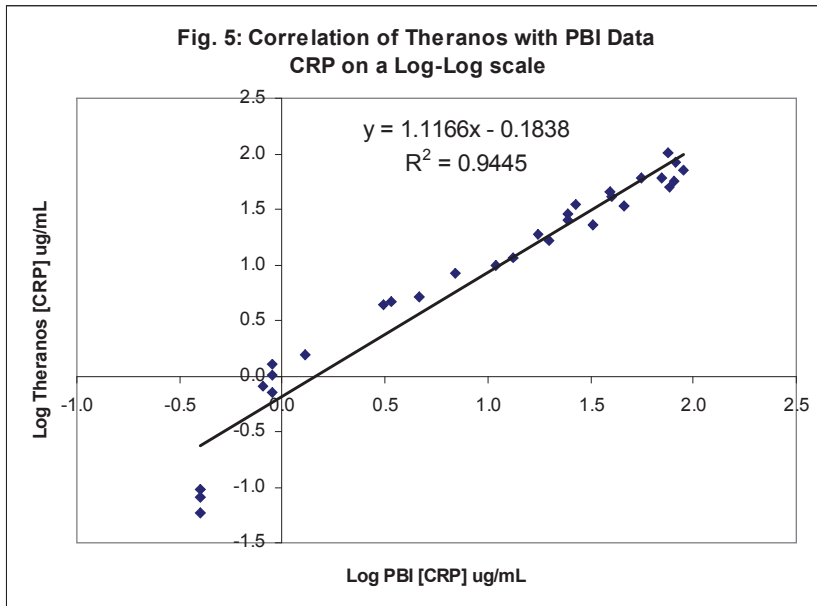
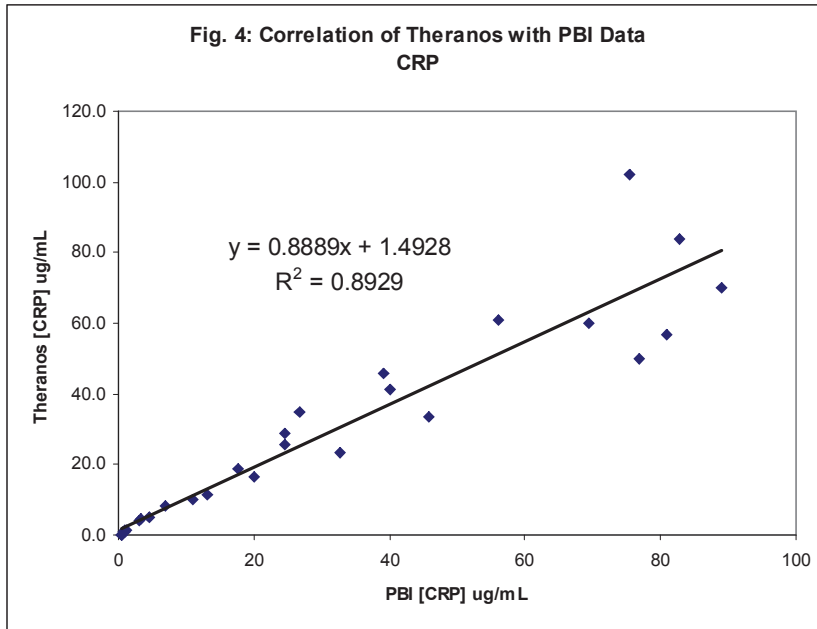


Table 1: IL-6 results from Theranos Systems and PBI for 10 patients at 3 time points

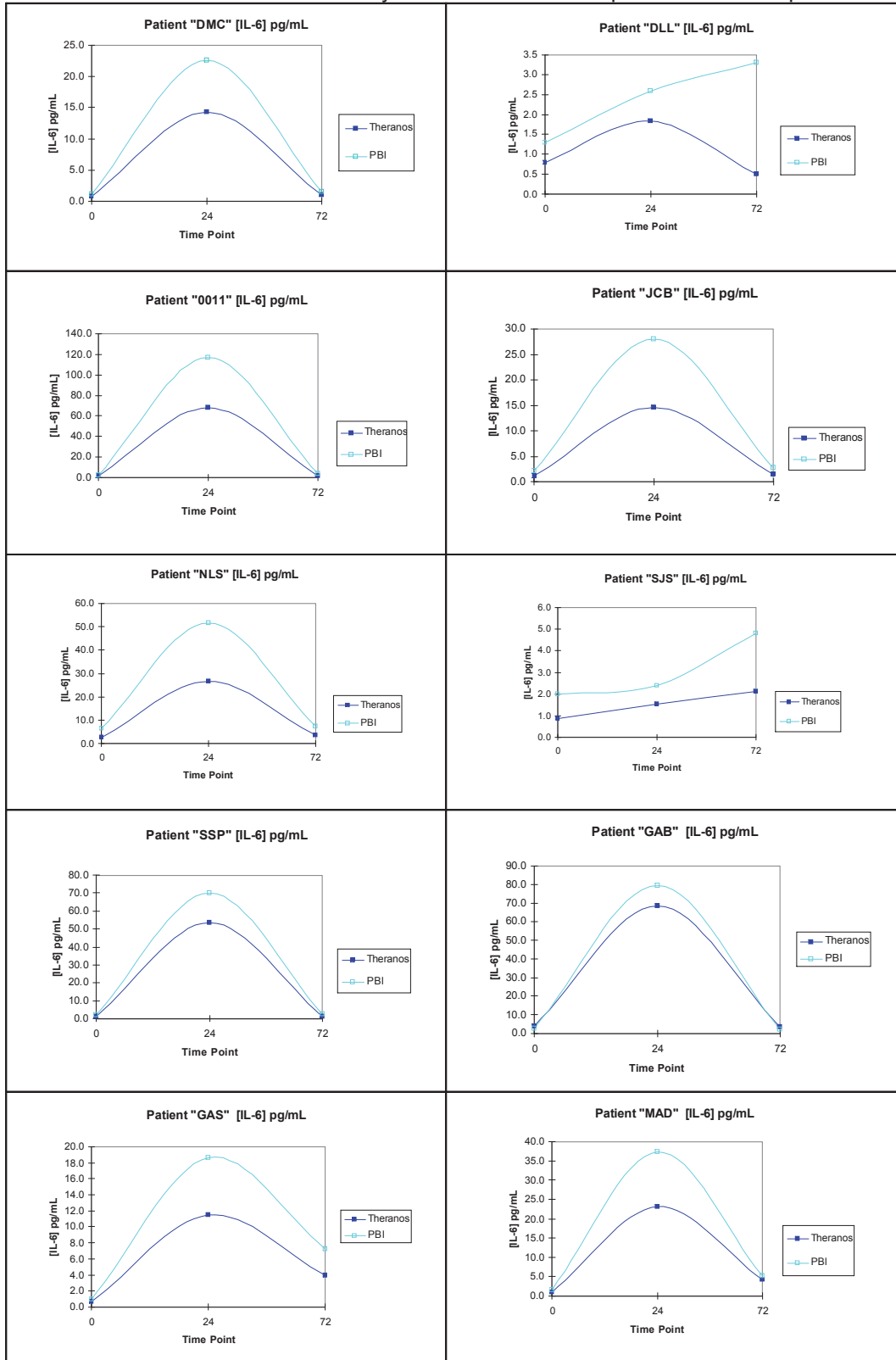




Table 2: TNF- $\alpha$  results from Theranos Systems and PBI for 10 patients at 3 time points

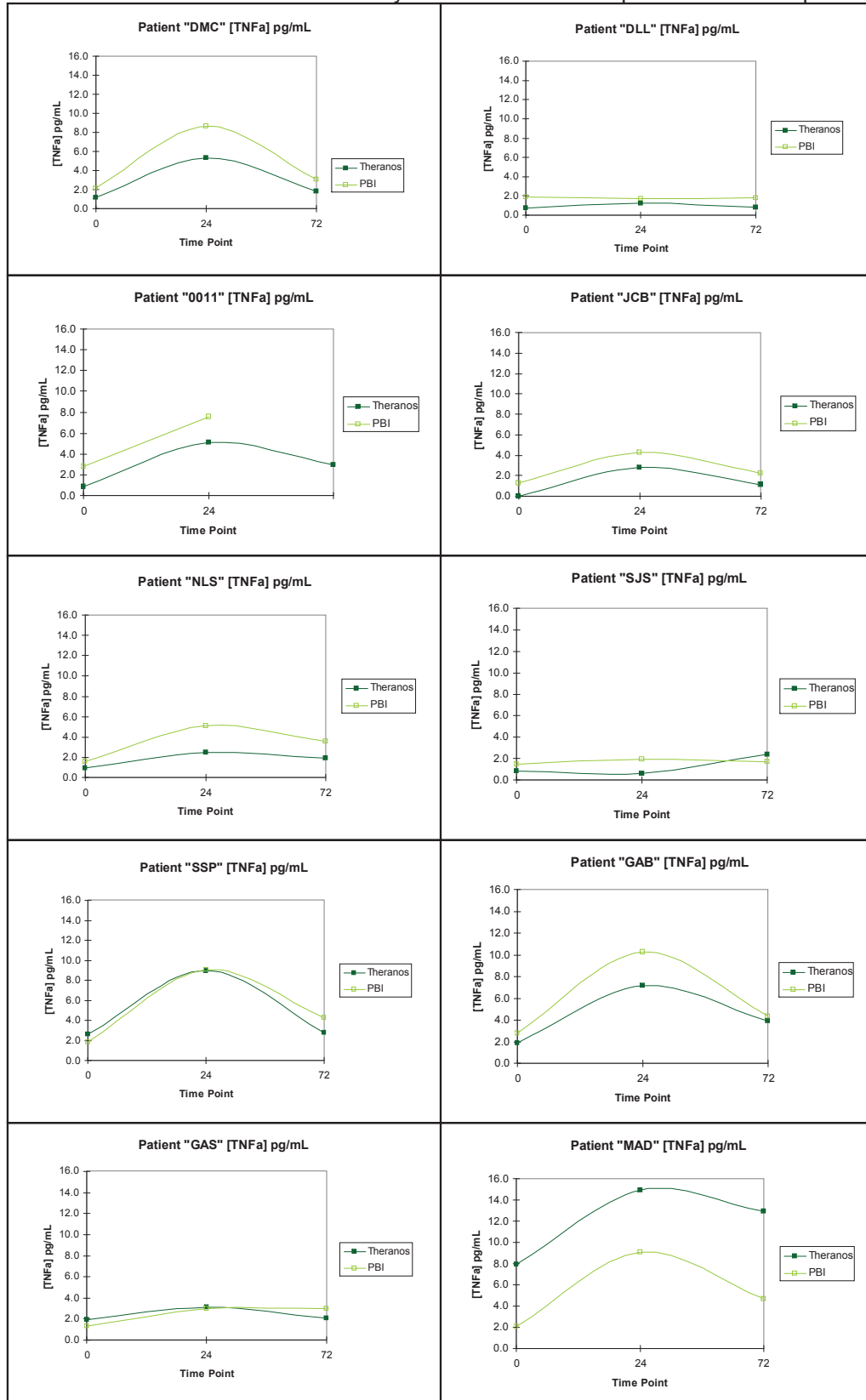


Table 3: CRP results from Theranos Systems and PBI for 10 patients at 3 time points

