

Supplementary Table SI. Data sources

| Trait | GWAS ID | Case/control | SNPs |
|------------------------|------------------|---------------------|-------------|
| Membranous nephropathy | ebi-a-GCST010005 | 2,150/5,829 | 5,327,688 |

| Trait | GWAS ID | Case/control | SNPs |
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| CD19 on naive-mature B cell | ebi-a-GCST90001737 | 3653 | NA |
| CD27 on CD20- B cell | ebi-a-GCST90001796 | 3634 | NA |
| CD20 on IgD- CD38+ B cell | ebi-a-GCST90001756 | 3659 | NA |
| CD19 on IgD- CD38- B cell | ebi-a-GCST90001733 | 3657 | NA |
| CD20 on IgD+ CD38+ B cell | ebi-a-GCST90001751 | 3657 | NA |
| CD19 on IgD+ CD38+ B cell | ebi-a-GCST90001729 | 3657 | NA |
| CD19 on IgD- CD38dim B cell | ebi-a-GCST90001735 | 3657 | NA |
| BAFF-R on IgD- CD38dim B cell | ebi-a-GCST90001714 | 3657 | NA |
| CD20 on memory B cell | ebi-a-GCST90001758 | 3657 | NA |
| CD25 on CD20- CD38- B cell | ebi-a-GCST90001776 | 3505 | NA |
| CD19 on IgD+ B cell | ebi-a-GCST90001741 | 3658 | NA |
| CD19 on memory B cell | ebi-a-GCST90001736 | 3657 | NA |
| CD24 on IgD- CD38dim B cell | ebi-a-GCST90001770 | 3649 | NA |
| CD25 on IgD+ CD24- B cell | ebi-a-GCST90001779 | 3657 | NA |
| CD25 on IgD- CD38- B cell | ebi-a-GCST90001787 | 3657 | NA |
| CD20 on CD24+ CD27+ B cell | ebi-a-GCST90001745 | 3657 | NA |
| CD20 on IgD- CD38dim B cell | ebi-a-GCST90001757 | 3657 | NA |
| CD19 on IgD+ CD38- naive B cell | ebi-a-GCST90001727 | 1830 | NA |
| CD19 on transitional B cell | ebi-a-GCST90001742 | 3657 | NA |
| CD20 on IgD+ CD24+ B cell | ebi-a-GCST90001746 | 3657 | NA |
| BAFF-R on IgD+ B cell | ebi-a-GCST90001719 | 3658 | NA |
| CD25 on IgD- CD38dim B cell | ebi-a-GCST90001789 | 3657 | NA |
| CD19 on CD20- B cell | ebi-a-GCST90001721 | 3656 | NA |
| CD19 on IgD- CD38+ B cell | ebi-a-GCST90001734 | 3658 | NA |
| CD25 on IgD+ CD38- B cell | ebi-a-GCST90001780 | 3642 | NA |
| BAFF-R on unswitched memory B cell | ebi-a-GCST90001717 | 3657 | NA |

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| CD24 on memory B cell | ebi-a-GCST90001771 | 3653 | NA |
| CD25 on IgD- CD24- B cell | ebi-a-GCST90001785 | 3649 | NA |
| BAFF-R on naive-mature B cell | ebi-a-GCST90001716 | 3657 | NA |
| CD27 on CD20- CD38- B cell | ebi-a-GCST90001797 | 3592 | NA |
| CD20 on IgD+ CD38dim B cell | ebi-a-GCST90001752 | 3657 | NA |
| CD19 on CD20- CD38- B cell | ebi-a-GCST90001722 | 3595 | NA |
| CD25 on IgD+ CD38- unswitched memory B cell | ebi-a-GCST90001782 | 1837 | NA |
| CD19 on unswitched memory B cell | ebi-a-GCST90001738 | 3656 | NA |
| CD20 on IgD- CD38- B cell | ebi-a-GCST90001755 | 3657 | NA |
| CD20 on IgD+ B cell | ebi-a-GCST90001762 | 3658 | NA |
| CD20 on unswitched memory B cell | ebi-a-GCST90001760 | 3657 | NA |
| CD25 on IgD+ B cell | ebi-a-GCST90001794 | 3658 | NA |
| CD45 on B cell | ebi-a-GCST90001910 | 3112 | NA |
| CD25 on memory B cell | ebi-a-GCST90001790 | 3657 | NA |
| CD25 on naive-mature B cell | ebi-a-GCST90001791 | 3657 | NA |
| BAFF-R on IgD- CD38+ B cell | ebi-a-GCST90001713 | 3659 | NA |
| CD24 on unswitched memory B cell | ebi-a-GCST90001772 | 3655 | NA |
| CD20 on IgD+ CD24- B cell | ebi-a-GCST90001747 | 3657 | NA |
| CD20 on CD20- CD38- B cell | ebi-a-GCST90001744 | 3606 | NA |
| BAFF-R on IgD- CD27- B cell | ebi-a-GCST90001711 | 3657 | NA |
| CD20 on B cell | ebi-a-GCST90001743 | 3660 | NA |
| CD24 on IgD+ CD38+ B cell | ebi-a-GCST90001768 | 3655 | NA |
| CD25 on switched memory B cell | ebi-a-GCST90001793 | 3657 | NA |
| CD19 on IgD- CD24- B cell | ebi-a-GCST90001731 | 3655 | NA |
| CD19 on switched memory B cell | ebi-a-GCST90001740 | 3657 | NA |
| CD19 on IgD+ CD38- unswitched memory B cell | ebi-a-GCST90001728 | 1833 | NA |
| CD19 on CD24+ CD27+ B cell | ebi-a-GCST90001723 | 3656 | NA |
| CD24 on IgD- CD38- B cell | ebi-a-GCST90001769 | 3648 | NA |
| CD24 on switched memory B cell | ebi-a-GCST90001773 | 3652 | NA |
| CD25 on IgD+ CD38dim B cell | ebi-a-GCST90001784 | 3657 | NA |

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| SSC-A on B cell | ebi-a-GCST90002075 | 3112 | NA |
| CD20 on IgD- CD24- B cell | ebi-a-GCST90001753 | 3657 | NA |
| CD24 on transitional B cell | ebi-a-GCST90001774 | 3656 | NA |
| CD19 on IgD- CD27- B cell | ebi-a-GCST90001732 | 3656 | NA |
| CD20 on IgD+ CD38- B cell | ebi-a-GCST90001748 | 3645 | NA |
| BAFF-R on switched memory B cell | ebi-a-GCST90001718 | 3657 | NA |
| CD25 on B cell | ebi-a-GCST90001775 | 3660 | NA |
| CD20 on IgD+ CD38- naive B cell | ebi-a-GCST90001749 | 1834 | NA |
| BAFF-R on IgD- CD24- B cell | ebi-a-GCST90001710 | 3657 | NA |
| CD25 on IgD+ CD38+ B cell | ebi-a-GCST90001783 | 3656 | NA |
| CD25 on IgD- CD27- B cell | ebi-a-GCST90001786 | 3651 | NA |
| CD25 on IgD+ CD24+ B cell | ebi-a-GCST90001778 | 3657 | NA |
| BAFF-R on IgD- CD38- B cell | ebi-a-GCST90001712 | 3657 | NA |
| CD27 on CD24+ CD27+ B cell | ebi-a-GCST90001798 | 3657 | NA |
| BAFF-R on memory B cell | ebi-a-GCST90001715 | 3657 | NA |
| CD25 on CD24+ CD27+ B cell | ebi-a-GCST90001777 | 3657 | NA |
| CD20 on naive-mature B cell | ebi-a-GCST90001759 | 3657 | NA |
| CD24 on IgD+ CD38- unswitched memory B cell | ebi-a-GCST90001767 | 1832 | NA |
| CD19 on IgD+ CD38dim B cell | ebi-a-GCST90001730 | 3657 | NA |
| CD25 on IgD- CD38+ B cell | ebi-a-GCST90001788 | 3656 | NA |
| CD24 on CD24+ CD27+ B cell | ebi-a-GCST90001764 | 3654 | NA |
| CD19 on IgD+ CD24- B cell | ebi-a-GCST90001725 | 3656 | NA |
| HLA DR on B cell | ebi-a-GCST90002116 | 3060 | NA |
| CD24 on IgD+ CD24+ B cell | ebi-a-GCST90001765 | 3655 | NA |
| CD25 on transitional B cell | ebi-a-GCST90001795 | 3657 | NA |
| BAFF-R on transitional B cell | ebi-a-GCST90001720 | 3655 | NA |
| FSC-A on B cell | ebi-a-GCST90001968 | 3112 | NA |
| CD20 on IgD+ CD38- unswitched memory B cell | ebi-a-GCST90001750 | 1836 | NA |
| CD20 on transitional B cell | ebi-a-GCST90001763 | 3657 | NA |
| CD20 on switched memory B cell | ebi-a-GCST90001761 | 3657 | NA |

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| CD19 on B cell | ebi-a-GCST90002028 | 3112 | NA |
| CD19 on IgD+ CD38- B cell | ebi-a-GCST90001726 | 3645 | NA |
| CD19 on IgD+ CD24+ B cell | ebi-a-GCST90001724 | 3656 | NA |
| CD25 on IgD+ CD38- naive B cell | ebi-a-GCST90001781 | 1835 | NA |
| CD25 on unswitched memory B cell | ebi-a-GCST90001792 | 3657 | NA |
| CD20 on IgD- CD27- B cell | ebi-a-GCST90001754 | 3657 | NA |
| CD24 on IgD+ CD38- B cell | ebi-a-GCST90001766 | 3638 | NA |
| CD20- CD38- B cell Absolute Count | ebi-a-GCST90001423 | 3658 | NA |
| IgD+ CD24+ B cell %B cell | ebi-a-GCST90001411 | 3657 | NA |
| IgD- CD24- B cell %B cell | ebi-a-GCST90001413 | 3657 | NA |
| IgD+ B cell %B cell | ebi-a-GCST90001391 | 3658 | NA |
| CD24+ CD27+ B cell %B cell | ebi-a-GCST90001417 | 3657 | NA |
| IgD- CD24- B cell Absolute Count | ebi-a-GCST90001414 | 3656 | NA |
| Memory B cell Absolute Count | ebi-a-GCST90001407 | 3656 | NA |
| IgD+ CD24- B cell %B cell | ebi-a-GCST90001415 | 3657 | NA |
| IgD- CD24- B cell %lymphocyte | ebi-a-GCST90001440 | 3656 | NA |
| IgD+ CD38dim B cell %B cell | ebi-a-GCST90001393 | 3657 | NA |
| BAFF-R on IgD+ CD38- naive B cell | ebi-a-GCST90001706 | 1837 | NA |
| CD20- B cell %B cell | ebi-a-GCST90001419 | 3658 | NA |
| IgD- CD38- B cell %B cell | ebi-a-GCST90001445 | 3657 | NA |
| IgD+ CD38- B cell %B cell | ebi-a-GCST90001395 | 3657 | NA |
| BAFF-R on IgD+ CD38dim B cell | ebi-a-GCST90001709 | 3657 | NA |
| CD20- CD38- B cell %lymphocyte | ebi-a-GCST90001444 | 3658 | NA |
| BAFF-R on IgD+ CD38- B cell | ebi-a-GCST90001705 | 3645 | NA |
| IgD+ CD38dim B cell Absolute Count | ebi-a-GCST90001394 | 3656 | NA |
| Naive-mature B cell Absolute Count | ebi-a-GCST90001409 | 3656 | NA |
| Transitional B cell Absolute Count | ebi-a-GCST90001577 | 3656 | NA |
| Memory B cell %B cell | ebi-a-GCST90001406 | 3657 | NA |
| B cell %lymphocyte | ebi-a-GCST90001644 | 3669 | NA |
| IgD- CD38- B cell Absolute Count | ebi-a-GCST90001446 | 3656 | NA |
| Transitional B cell %B cell | ebi-a-GCST90001576 | 3657 | NA |
| IgD- CD38- B cell %lymphocyte | ebi-a-GCST90001427 | 3656 | NA |

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| IgD+ CD24- B cell %lymphocyte | ebi-a-GCST90001441 | 3656 | NA |
| Plasma Blast-Plasma Cell %B cell | ebi-a-GCST90001404 | 3658 | NA |
| Transitional B cell %lymphocyte | ebi-a-GCST90001578 | 3656 | NA |
| IgD+ B cell Absolute Count | ebi-a-GCST90001400 | 3657 | NA |
| Naive-mature B cell %B cell | ebi-a-GCST90001408 | 3657 | NA |
| CD20- B cell Absolute Count | ebi-a-GCST90001421 | 3657 | NA |
| IgD+ CD38dim B cell %lymphocyte | ebi-a-GCST90001430 | 3656 | NA |
| IgD+ CD38- B cell %lymphocyte | ebi-a-GCST90001431 | 3656 | NA |
| Switched memory B cell %lymphocyte | ebi-a-GCST90001434 | 3656 | NA |
| IgD- CD27- B cell Absolute Count | ebi-a-GCST90001401 | 3656 | NA |
| BAFF-R on IgD+ CD38- unswitched memory B cell | ebi-a-GCST90001707 | 1837 | NA |
| Switched memory B cell %B cell | ebi-a-GCST90001402 | 3657 | NA |
| IgD- CD38dim B cell %B cell | ebi-a-GCST90001428 | 3657 | NA |
| IgD- CD38+ B cell %lymphocyte | ebi-a-GCST90001425 | 3656 | NA |
| Naive-mature B cell %lymphocyte | ebi-a-GCST90001437 | 3656 | NA |
| CD24+ CD27+ B cell %lymphocyte | ebi-a-GCST90001442 | 3656 | NA |
| T/B cell | ebi-a-GCST90001588 | 3653 | NA |
| CD20- B cell %lymphocyte | ebi-a-GCST90001443 | 3657 | NA |
| Unswitched memory B cell %B cell | ebi-a-GCST90001397 | 3657 | NA |
| IgD- CD38+ B cell %B cell | ebi-a-GCST90001410 | 3657 | NA |
| Switched memory B cell Absolute Count | ebi-a-GCST90001403 | 3656 | NA |
| BAFF-R on IgD+ CD38+ B cell | ebi-a-GCST90001708 | 3656 | NA |
| IgD- CD27- B cell %lymphocyte | ebi-a-GCST90001433 | 3656 | NA |
| Unswitched memory B cell %lymphocyte | ebi-a-GCST90001432 | 3656 | NA |
| IgD- CD38+ B cell Absolute Count | ebi-a-GCST90001420 | 3656 | NA |
| IgD+ CD38+ B cell %B cell | ebi-a-GCST90001447 | 3657 | NA |
| IgD+ CD38+ B cell Absolute Count | ebi-a-GCST90001392 | 3656 | NA |
| Memory B cell %lymphocyte | ebi-a-GCST90001436 | 3656 | NA |
| B cell Absolute Count | ebi-a-GCST90001642 | 3653 | NA |
| Unswitched memory B cell Absolute Count | ebi-a-GCST90001398 | 3656 | NA |
| IgD+ CD24+ B cell Absolute Count | ebi-a-GCST90001412 | 3656 | NA |

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|------------------------------------|--------------------|------|----|
| IgD+ CD24- B cell Absolute Count | ebi-a-GCST90001416 | 3656 | NA |
| IgD+ CD38+ B cell %lymphocyte | ebi-a-GCST90001429 | 3656 | NA |
| IgD- CD38dim B cell Absolute Count | ebi-a-GCST90001438 | 3656 | NA |
| BAFF-R on CD20- CD38- B cell | ebi-a-GCST90001701 | 3592 | NA |
| IgD+ CD38- B cell Absolute Count | ebi-a-GCST90001396 | 3656 | NA |
| CD20- CD38- B cell %B cell | ebi-a-GCST90001422 | 3659 | NA |
| CD24+ CD27+ B cell Absolute Count | ebi-a-GCST90001418 | 3656 | NA |
| BAFF-R on IgD+ CD24- B cell | ebi-a-GCST90001704 | 3657 | NA |
| BAFF-R on CD24+ CD27+ B cell | ebi-a-GCST90001702 | 3657 | NA |
| B cell %CD3- lymphocyte | ebi-a-GCST90001643 | 3669 | NA |
| BAFF-R on IgD+ CD24+ B cell | ebi-a-GCST90001703 | 3657 | NA |
| IgD- CD27- B cell %B cell | ebi-a-GCST90001399 | 3657 | NA |
| IgD+ B cell %Lymphocyte | ebi-a-GCST90001424 | 3657 | NA |
| IgD+ CD24+ B cell %lymphocyte | ebi-a-GCST90001439 | 3656 | NA |
| IgD- CD38dim B cell %lymphocyte | ebi-a-GCST90001426 | 3656 | NA |