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Transcriptomic gene signatures associated with persistent airflow limitation in patients with severe asthma

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Take home message

Persistent airflow limitation in severe asthma is associated with a mechanism in which IL-13 and remodeling are involved.

Abstract (max 200 words)

Rationale: A proportion of severe asthma patients suffers from persistent airflow limitation, often associated with more symptoms and exacerbations. Little is known about the underlying mechanisms. Aiming for discovery of unexplored potential mechanisms, we used Gene Set Variation Analysis (GSVA), a sensitive technique that can detect underlying pathways in heterogeneous samples.

Methods: Severe asthma patients from the U-BIOPRED cohort with persistent airflow limitation (post-bronchodilator FEV_1/FVC ratio < lower limit of normal) were compared to those without persistent airflow limitation. Gene expression was assessed on the total RNA of sputum cells, nasal brushings and endobronchial brushings and biopsies. GSVA was applied to identify differentially-enriched pre-defined gene signatures based on all available gene expression publications and data on airways disease.

Results: Differentially-enriched gene signatures were identified in nasal brushings (1), sputum (9), bronchial brushings (1) and bronchial biopsies (4), that were associated with response to inhaled steroids, eosinophils, IL-13, IFN-alpha, specific CD4+ T-cells and airway remodeling.

Conclusion: Persistent airflow limitation in severe asthma has distinguishable underlying gene networks that are associated with treatment, inflammatory pathways and airway remodeling. These results point towards targets for the therapy of persistent airflow limitation in severe asthma.

Introduction

A small proportion of asthma patients suffers from uncontrolled disease despite treatment with high-dose inhaled or oral steroids, which is defined as severe asthma [1, 2]. These patients are in need of effective and steroid-sparing treatments. However, severe asthma is a heterogeneous disease, which complicates the development of these treatments [3, 4]. Emerging targeted treatments appear to be successful in selected subgroups of patients with specific characteristics, such as eosinophilic airway inflammation [5] and allergy [6] emphasizing the need for precision medicine in severe asthma [7].

Agusti *et al*. recently described a novel strategy for the treatment of chronic airways disease, focusing on treatable traits based on clinical, physiological and/or biological characteristics rather than solely on a diagnosis of asthma or COPD [8]. Persistent airflow limitation (PAL) was postulated as a treatable trait of airways disease, being characterized by reduced expiratory flow even after the administration of a short-acting bronchodilator. Notably, PAL is not only a determinant for the diagnosis of COPD, but regardless of a smoking history, has also long been implicated in patients with severe asthma [9].

PAL is clinically relevant in severe asthma as it may have prognostic implications. Even though PAL and exacerbations are different phenotypic characteristics, there is evidence of an association of PAL with more frequent exacerbations and more hospitalizations in subgroups of severe asthma patients [10, 11]. Clinical clustering studies showed that PAL is an important constituent for severe asthma phenotypes that are characterized by eosinophilic airway inflammation, poor quality of life and smoking history [11-14]. To understand this clinical trait, several studies have been conducted to identify risk factors for PAL in smoking and non-smoking severe asthmatics. Eosinophilic airway inflammation [9, 15], longer duration of disease [9, 15, 16], adult-onset of disease [9] and a history of smoking [16] appear to be the most important. However, management strategies for the prevention

or treatment of PAL in severe asthma are lacking, which is unsurprising given the lack of knowledge regarding its mechanism.

Airway remodeling, associated with chronic inflammation, may contribute to PAL in asthma. Thickening of the airway smooth muscle layer [15], changes in extracellular matrix e.g. subepithelial fibrosis [17] and infiltration of inflammatory cells in the bronchial airway wall [18] have been linked to increased lung function decline. Even though studies have been conducted to identify underlying pathways of airway remodeling [19, 20], little is known about the underlying mechanism of PAL in severe asthma. Notably, there are differences in airway remodeling between patients with severe and patients with non-severe asthma [21], demonstrating the need to examine the underlying pathways of PAL in patients with severe asthma themselves.

Gene Set Variation Analysis (GSVA) is a sensitive statistical technique that can be used for identifying underlying pathways in heterogeneous samples [22]. Instead of more conventional analysis of single gene expression, GSVA allows between-groups comparisons of the expression of gene sets that are known to be associated with biological networks of relevance. This identifies differences in underlying pathways in severe asthma patients with PAL in comparison to those without PAL.

We hypothesized that patients with severe asthma and PAL exhibit different gene expression profiles as compared to those without PAL. The aim of the present study was to identify transcriptomic pathways of PAL in severe asthma by applying GSVA in sputum, nasal brushings and endobronchial brushings and biopsies. This study was conducted in the severe asthma adult cohort of the U-BIOPRED study, which according to a recent cluster analysis based on clinical and physiological parameters includes subsets of patients with and without PAL [23].

Methods

The detailed methods section is provided in full in the Online Supplement.

Design and subjects

This was a cross-sectional, observational study using data from the adult severe asthma cohort of U-BIOPRED. Details on the design of U-BIOPRED have been published previously [24]. Severe asthma was defined according to the IMI consensus statement [25]. Patients were included who had a confirmed diagnosis of asthma that was uncontrolled despite high intensity asthma treatment (≥1000µg Fluticasone eq. plus a second controller) or could only be controlled with treatment by systemic oral corticosteroids (OCS) or omalizumab, including current-smokers, ex-smokers and never-smokers. The U-BIOPRED study was registered at ClinicalTrials.gov identifier NCT01976767 and was approved by the Medical Ethics Boards of all participating centers. All patients provided written informed consent.

Persistent Airflow Limitation

PAL was defined as post-bronchodilator FEV_1/FVC < lower limit of normal (LLN). The LLN was calculated according to formulae provided by Quanjer *et al.* [26] (for male subjects: -0.18*AGE + 75.41; for female subjects: -0.19*AGE + 78.4), consistent to LLN defined by Global Lung Function Initiative (GLI) [27]. In order to examine consistency with other criteria for PAL we additionally performed an analysis based on PAL defined by post-bronchodilator FEV_1 < LLN.

Measurements

mRNA samples

Gene expression was assessed on the total RNA in unselected samples of severe asthma patients in the following four airway compartments: (1) nasal brushing (n=37), (2) induced sputum (n=79), (3)

endobronchial brushings (n=62) and (4) endobronchial biopsies (n=50). There was no complete overlap between the samples, mainly because of limited sputum induction success rate (Fig. 1). For details on sample collection see online supplement.

Microarray analysis was performed with the Affymetrix HT HG-U133+ PM microarray platform (Affymetrix, Santa Clara, Ca). For details see online supplement.

Statistical analysis

For details on the statistical analysis on clinical variables see online supplement.

Gene set variation analysis (GSVA) is a statistical technique that allows sensitive identification of differences in expression of predefined sets of genes between heterogeneous groups and can be used to explore underlying pathways [22]. Sets of genes used were based on all available gene expression publications and data on airways disease, including human and murine models, from both *in vivo* and *in vitro* studies, to assure sensitive pathway detection. These contained studies on the gene expression associated with (1) airway disease treatment, (2) immunologic pathways and (3) induced lung injury or inflammation. The latter included gene signatures that were identified at several time points after the admission of either Poly(I:C) as a model for exacerbations [28] or bleomycin, which is used as a model for mimicking the course of fibrotic processes in the lung [29]. For this discovery study 105 predefined gene sets were entered into the statistical models (Table E8).

Enrichment scores and false discovery

GSVA was used to calculate enrichment scores (ES) for each patient and for each of the gene signatures based on the gene expression of genes in the sets. ES range from a value of -1 to 1 [22]. Subsequently, mean ES were calculated for patients with and without PAL and Generalized Linear Models, including correction for smoking status, corticosteroid usage and duration of asthma, were applied to statistically compare ES between the groups. To minimize the false discovery rate, only

gene signatures that had $p<0.05$ and a difference of ES (dES) between of the groups of ≥ 0.2 were considered significantly different, following the Microarray Consortium for Quality Control (MACQC) recommendations regarding the need for applying group-difference thresholds in order to stringently limit false discovery [30].

Results

Of 421 severe asthma patients in the U-BIOPRED cohort 224 (58%) had PAL. These patients were significantly older and had longer asthma duration than severe asthma patients without PAL (Table 1). In addition, they had significantly more eosinophilia in blood and sputum. Patients with and without PAL did not significantly differ in smoking behavior, pack years and exacerbation rate. Some distinct patient characteristics were found when patients were grouped according to site of mRNA collection. Significantly fewer females and higher blood neutrophil counts were observed in patients with PAL in the nasal and endobronchial brushing subsets. In addition, the number of pack years was higher in patients with PAL in the endobronchial brushings and biopsies subsets (Table 2 and see Tables E1-E4 for p-values).

Identified Gene Signatures

In total, GSVA identified 14 gene signatures that were significantly differentially enriched in patients with PAL as compared to those without PAL: 1 in the nasal brushes, 9 in sputum, 1 in endobronchial brushes and 4 in endobronchial biopsies (Table 3).

Treatment gene signatures

Two gene signatures that were expressed to a lesser extent in asthmatics and COPD patients after treatment with fluticasone were significantly differentially enriched. The gene signature lowly expressed in fluticasone-treated asthma (Table E7, #12) patients was significantly more enriched in the bronchial brushes of patients with PAL (dES 0.22, p=0.0012). Similarly, the lowly expressed gene signature after fluticasone treatment in COPD patients, containing a different set of genes (Table E7, 34), was also enriched to a greater extent in patients with PAL (dES 0.22; p=0.045) (Table 3 and Fig. 4 and Fig. 5).

Immunologic gene signatures

Four gene signatures that are associated with immunologic pathways were identified to be significant differentially enriched between the groups. First, a gene signature that is upregulated in the presence of eosinophils (Table E7, #55) was more enriched in the sputum of patients with PAL as compared to without PAL (dES = 0.21, p=0.04) (Fig. 3). Second, a gene signature that is identified to be associated with the presence of IL-13 (Table E7, #101) was more enriched in the nasal brushings of PAL patients (dES=0.27; p=0.045) (Fig. 2). Third, the ES for the IFN-alpha gene signature (Table E7, #36) was less enriched in the sputum of patients with PAL (dES=0.32; p<0.001) (Fig. 3). Finally, the ES for CD4 T-cells of rheumatoid arthritis patients (Table E7, #27) was more enriched in patients with PAL (dES = 0.21, p=0.029) (Fig. 3).

Induced lung injury gene signatures

In total eight gene signatures that are associated with induced airway inflammation or lung injury were identified to be significantly differentially enriched. Five of them were discovered in a study in which gene expression was assessed at different time points after the admission of Poly I:C (Table E7, #57,58,62,64,65), mimicking viral replication. Patients with PAL had significant lower enrichment of these signatures in sputum, ranging from dES -0.25 to -0.20 (Fig. 3). In addition, three gene signatures associated with Bleomycin-induced lung injury (Table E7, #67,68,77) were significantly differentially enriched, one associated with higher expression of genes during early development of injury (Table E7, #67) demonstrating a significantly lower ES in sputum (dES = -0.24; p=0.012), and a higher ES in endobronchial biopsy (dES = 0.22; p=0.045) in PAL patients. In addition, the gene signatures identified to be higher expressed at later stages of bleomycin-induced injury (Table 5, #67,77) had a lower ES in PAL patients (dES = -0.20; p=0.006) (dES = -0.41; p=0.026) (Table 3 and Fig. 5).

Consistency when using different definition of PAL

The data when using postbronchodilator-FEV_1 for defining PAL is given in the online supplement. This showed that in general identified signatures between FEV_1/FVC < LLN and FEV_1 <LLN were similar, including those associated with treatment with fluticasone, eosinophilic inflammation and involvement of T_H2 helper cells and IFN-alpha. In addition, induced lung injury and inflammation gene signatures were identified in both analyses as well (Table E6). However, specific involvement of IL-13 and CD4 T-cells of rheumatoid arthritis was not consistent, and no significant gene signatures were identified in the biopsies when applying FEV_1 < LLN.

Discussion

This study shows that severe asthma patients with PAL have differentially enriched gene sets as compared to patients without PAL, suggesting that distinguishable underlying mechanisms are involved. The identified gene signatures may indicate that these patients respond or have responded differently to treatment with inhaled corticosteroids, and that particular immunologic pathways are involved. These include the already recognized eosinophilic airway inflammation, but also specific CD4+ T-cells and involvement of IL-13, possibly via T_H2-helper cells. In addition, a differentially expressed gene network associated with remodeling was identified in the endobronchial airway wall, whilst not being identified in other compartments, underlining local involvement of remodeling. These results show that PAL is biologically distinguishable in severe asthma and point towards possible targets for the prevention and treatment of PAL.

This study is the first to assess gene signatures underlying PAL for the discovery of its mechanisms in severe asthma. Clinical characterization of the present patients with PAL showed no association with exacerbation rate. Multiple studies in severe asthma have shown mixed results. Some found associations between more frequent exacerbations and PAL, especially in certain phenotypes of severe asthma [10, 11], whereas others observed no association [13] or even an inverse one indicative of more frequent exacerbations in patients without PAL [9]. This suggests that certain subgroups of severe asthma patients may suffer from both clinical traits. However, in a broad severe asthma population, such as the present study, PAL and exacerbations may need to be seen as separate clinical treats.

GSVA not only confirmed expected mechanisms but also identified novel pathways in PAL. First, the results indicate that the airways of severe asthma patients with PAL respond differently to the administration of inhaled corticosteroids. Even though a relation between severe asthma and resistance to steroids has been recognized [31], a specific association with PAL has not previously

been reported. Second, not surprisingly, a gene set associated with eosinophilic airway inflammation was identified in the sputum of patients with PAL. Eosinophilic airway inflammation has been reported in patients with PAL by multiple studies in severe asthma and was present in this study population as well [9, 14, 15]. Third, IL-13 was identified to be involved in PAL in severe asthma, which was in concordance with a study by Kaminska *et al.* who identified IL-13 in bronchial biopsies of severe asthma patients with PAL [32].

Interestingly, in sputum samples we have identified a gene set associated with interferon-alpha (IFN-alpha) that was lower enriched in patients with PAL. Impaired or decreased IFN-alpha has been associated with severe asthma as compared to controls [33, 34] and, in a murine asthma model, where IFN-alpha inhibits eosinophilic airway inflammation and hyperresponsiveness [35]. However, a direct association with PAL in (severe) asthma has not been described before. In addition, patients with PAL appear to have lower enrichment of gene sets expressed after exposure to Poly(I:C), mimicking viral replication upon infection. The recognized link between Poly(I:C) and interferons strengthen these results [36]. Impaired lung function has been found after exposure to Poly(I:C) in mice [37], however it is unknown to what extent the ability to respond to viral infections influences lung function. Moreover, the present data indicate a role for CD4+ T-cells, which has been associated previously with reduced lung function in patients with asthma [18]. Finally, remodeling has been recognized to be associated with PAL in (severe) asthma [17, 18] and in concert with this, our data identified gene sets associated with bleomycin-induced lung injury and fibrotic processes in the endobronchial airway wall to be more enriched in severe asthma patients with PAL.

We believe the strengths of this study include the following. It was conducted in the severe asthma cohort of the pan-European U-BIOPRED study, which included a large number of well-selected and defined patients. The study included severe asthma patients with PAL and those without PAL with equally severe disease as an appropriate control group for analyzing the distinguishing gene

197 signatures of PAL amongst patients with severe asthma. The multi-centre design allowed
198 standardized collection of large numbers of samples from patients all over Europe. In addition,
199 collection of these samples was standardized and performed according to SOPs, whilst mRNA
200 expression in these samples was analyzed centrally to gain optimized data quality. Furthermore,
201 using GSVA as sensitive statistical technique enabled the identification of underlying pathways
202 involved in PAL even in heterogeneous samples, such as severe asthma. Finally, selection bias was
203 minimized by correction for smoking status, asthma duration and usage of oral corticosteroids as
204 such. However, correction for corticosteroid dose was not indicated as this was similar between the
205 groups. Similarly, no correction for cell counts was applied as this could partly obscure the disease
206 mechanism of PAL in severe asthma.

207 This study also has limitations. First, this was a cross-sectional study, whilst lung function may vary
208 over time. Stringent selection criteria for PAL were applied to minimize possible misdiagnosing of
209 patients, but we cannot exclude longitudinal variations in PAL. The definition of PAL was derived
210 from the LLN on two measures of PAL based on the Quanjer values. Applying the GLI reference
211 equations for the LLN to our dataset had very little influence on the distribution of patients with or
212 without PAL, since in total only 3 patients included in the GSVA analyses would switch groups.
213 Second, as shown in Figure 1, there is incomplete overlap of patients of whom various samples had
214 been collected, which was unintended but inevitable due to patient's consent, feasibility and quality
215 control (*e.g.* for bronchoscopies and induced sputum). This hampers comparison of the identified
216 gene sets between the different compartments. The sample size for nasal brushings for example was
217 modest. Nevertheless, concordance of identified gene signatures between the different
218 compartments (*e.g.* on gene sets for fluticasone treatment and Bleomycin-induced injury) and
219 concordance in identified gene signatures by applying two definitions for PAL lends validity to the
220 identified pathways in the different samples. Third, GSVA requires predefined gene sets to be put
221 into the analysis. These gene signatures are acquired from literature and are based on other studies

reported thus far. Inevitably, those studies had their own flaws as well, which were not taken into account in this study. In addition, some of the gene signatures are derived from mouse model studies. These data from mouse models was purposely included, because only by broad, non-selective input of gene signatures into the analysis, novel mechanisms involving in PAL may be discovered. However, it needs to be emphasized that murine models will certainly deviate from human disease and it remains to be established whether the murine signatures can be used to identify phenotypic differences in severe asthma. Furthermore, by applying predefined gene sets, we may have gene interactions that are not annotated yet and thus not identified in this study. Finally, this study did not include a separate validation set or internal validation. The sample sizes were not large enough for splitting into a training and validation set. However, we have applied the most stringent measures for the prevention of false discovery of gene signatures by only selecting gene signatures with a low p-value and a minimum difference of enrichment score, following the standardized Microarray Consortium for Quality Control (MACQC) recommendations for the importance of applying group-difference thresholds for gaining best reproducible results [30]. In addition, the results were largely consitent when defining PAL by using FEV_1 or FEV_1/FVC, which contributes to the validity of the data.

Based on the present results a few well-defined mechanisms are revealed in relation to PAL in severe asthma. First, involvement of IL-13 does not seem to be surprising. Not only because it has been directly associated with PAL before [32], but also because it has been linked to the other identified pathways in this study. IL-13 has been associated with resistance to steroids in asthma [31, 38], and is recognized as promotor for local eosinophil recruitment in the lungs [39]. In addition, IL-13 has been identified as a direct promotor for airway remodeling [40]. Thus, IL-13 may be an important hub for the several pathways involved in PAL in severe asthma.

Second, IFN-alpha deficiency, which may impair anti-viral responses [41], has been associated with persistent asthma as such [34]. In addition, a mouse model study indicates that IFN-alpha inhibits eosinophilic inflammation [33]. The results of our study imply that only the subgroup of severe asthma patients, suffering from PAL, exhibits IFN-alpha deficiency or impairment, which may well be associated with lower expression of gene sets associated with Poly(I:C). One could speculate that IFN-alpha deficiency could result in enhanced viral loads during an infection or exacerbation and in augmented inflammation, which in turn could result in airway wall remodeling and eventually PAL. Finally, different gene signatures appeared to be enriched in the four compartments. Gene expression related to airway remodeling was found in the more profound layers of the airway wall (biopsies), but not in the superficial layers and lumen. The opposite is true for gene signature related to inflammatory involvement, such as eosinophilia and CD4+ T-cells. This seems to be highly relevant, perhaps not unexpectedly implying differential pathways at different locations in the respiratory tract.

PAL has been recognized as a treatable trait in chronic airways disease [8]. Especially severe asthma patients with PAL have high disease burden and therefore are in need for more individualized management, so-called precision medicine. The present results suggest that patients with PAL may be less responsive to inhaled steroids. Taking into account that these patients have more symptoms and higher rates of exacerbations and hospitalizations [10], they seem to be the ones in most need for targeted medicines, such newly developed biologicals. For instance, the involvement of IL-13 pathways in these patients may make them primary candidates for treatment with anti-IL-13.

In conclusion, severe asthma patients with PAL express different gene mechanisms as compared to those without, being suggestive of specific disease mechanisms, including IL-13-associated disease pathways, such as eosinophilic airway inflammation and remodeling with involvement of impaired

IFN-alpha function. Therefore, these may be the patients to be selected for studies on emerging new treatments.

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Table 1: Patient characteristics of patients with persistent airflow limitation (PAL)

	no PAL	PAL	*P-value*
n	197	224	
Female (%)	131 (66.5)	130 (58.0)	0.087
Age (yrs)*	**49.6 ± 14.6**	**54.0 ± 12.0**	**0.001**
BMI (Kg/m2)*	29.8 ± 6.5	28.7 ± 6.0	0.081
Asthma Duration (yrs)†	**20.0 [10.0 - 31.0]**	**25.5 [13.0 - 41.0]**	**0.001**
Smoking history (%)			0.084
Never	133 (67.5)	131 (58.5)	
Ex-smoker	50 (25.4)	65 (29.0)	
Current smoker	14 (7.1)	28 (12.5)	
Packyears†	9.4 [3.9 - 20.0]	13.0 [4.5 - 22.5]	0.407
OCS dose†	10.0 [8.0 - 20.0]	10.0 [7.0 - 15.0]	0.288
ACQ*	2.6 ± 1.2	2.7 ± 1.2	0.143
Exacerbations per year †	2.0 [2.0 – 4.0]	2.0 [1.3 – 4.0]	0.750
pbFEV$_1$ (% pred)*	**89.0 ± 16.1**	**63.7 ± 18.0**	**<0.001**
Blood Eosinophils (x10^9/L)†	**0.2 [0.1 - 0.4]**	**0.3 [0.1 - 0.5]**	**0.009**
Blood Neutrophils (x10^9/L)†	4.7 [3.7 - 6.2]	5.0 [3.7 - 7.5]	0.119
Sputum Eosinophils (%)†	**1.2 [0.2 - 4.6]**	**4.8 [1.2 - 22.1]**	**0.001**
Sputum Neutrophils (%)*	51.2 ± 26.0	54.6 ± 26.2	0.412

* mean ± SD; † median [Interquartile Range]; PAL: persistent airflow limitation; OCS: Oral corticosteroids; ACQ: Asthma Control Questionnaire; FEV$_1$: Forced Expiratory Volume in the first second

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272 **Table 2: Patient characteristics of patients with persistent airflow limitation (PAL) according to site of mRNA collection**

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	Nasal Brush		Sputum		Endobronchial Brush		Endobronchial Biopsy	
	No PAL	**PAL**	**No PAL**	**PAL**	**No PAL**	**PAL**	**No PAL**	**PAL**
N	15	22	21	58	30	32	22	28
Gender = Female (%)	**11 (73.3%)***	**8 (36.4%)***	13 (61.9%)	35 (60.3%)	**19 (63.3)***	**10 (31.2)***	14 (63.6%)	12 (42.9%)
Age (yrs)	47.5 ± 16.2	53.2 ± 12.1	52.5 ± 13.9	54.2 ± 11.4	46.7 ± 14.0	53.0 ± 11.1	48.4 ± 12.6	52.7 ± 11.2
BMI (Kg/m^2)	34.1 ± 6.6	29.4 ± 5.7	28.2 ± 5.0	28.1 ± 5.3	31.3 ± 6.3	28.5 ± 6.1	30.2 ± 5.4	28.6 ± 6.4
Asthma Duration (yrs)	25.0 [14.0 - 38.0]	21.5 [17.0 - 40.5]	23.1 ± 14.5	26.8 ± 17.2	26.4 ± 16.8	26.7 ± 17.9	25.8 ± 15.5	30.5 ± 18.7
Smoking Status (%)								
Never Smokers	12 (80.0)	11 (50.0)	11 (52.4%)	35 (60.3%)	22 (73.3)	15 (46.9)	16 (72.7%)	16 (57.1%)
Ex-smokers	3 (20.0)	8 (36.4)	8 (38.1%)	18 (31.0%)	7 (23.3)	12 (37.5)	5 (22.7%)	6 (21.4%)
Current-smokers	0 (0.0)	3 (13.6)	2 (9.5%)	5 (8.6%)	1 (3.3)	5 (15.6)	1 (4.5%)	6 (21.4%)
Packyears†	5.0 [3.3 - 5.1]	20.0 [11.5 - 38.5]	13.8 [2.9 - 19.7]	10.0 [2.8 - 18.8]	**5.1 [1.4 - 8.1]***	**18.8 [7.0 - 24.0]***	**5.3 [2.0 - 13.4]***	**21.5 [18.0 - 27.5]***
OCS dose (mg)†	10.0 [8.0 - 25.0]	10.00 [8.12 - 13.75]	10.0 [8.8 - 12.5]	10.0 [6.9 - 13.1]	10.0 [10.0 - 21.3]	10.0 [6.5 - 16.3]	10.0 [7.9 - 10.0]	10.0 [6.0 - 15.0]
ACQ	1.9 ± 1.0	2.2 ± 1.2	2.6 ± 1.4	2.6 ± 1.3	2.1 ± 1.2	2.4 ± 1.0	2.3 (1.3)	2.4 (1.1)
Exacerbations per year†	2.5 [1.0 – 4.0]	3.0 [1.0 - 4.0]	2.0 [2.0 – 3.5]	2.0 [1.5 – 4.0]	2.0 [2.0 – 3.5]	3.0 [2.0 – 4.0]	2.0 [2.0 – 3.3]	3.0 [2.0 – 4.0]
pbFEV$_1$ (% predicted)	**99.4 ± 17.6***	**71.5 ± 14.9***	**90.2 ± 14.0***	**63.5 ± 19.9***	**91.9 ± 14.3***	**66.7 ± 15.5***	**89.6 ± 13.6***	**68.3 ± 15.2***
Blood Eosinophils (x10^3/L)†	0.2 [0.1 - 0.4]	0.2 [0.1 - 0.3]	0.2 [0.2 - 0.3]	0.4 [0.2 - 0.5]	0.2 [0.1 - 0.4]	0.2 [0.1 - 0.3]	0.2 [0.1 - 0.3]	0.2 [0.1 - 0.3]
Blood Neutrophils (x10^3/L)†	3.8 [3.6 - 5.1]	5.0 [4.2 - 7.8]	4.3 [3.3 - 6.3]	5.0 [3.9 - 7.5]	**4.0 [3.2 - 5.4]***	**5.8 [4.1 - 7.7]***	4.0 [3.5 - 5.3]	5.0 [4.3 - 7.3]
Sputum Eosinophils (%)†	1.4 [0.4 - 4.6]	2.6 [0.2 - 13.8]	**1.3 [0.2 - 3.8]***	**6.2 [1.3 - 28.5]***	1.4 [0.6 - 4.6]	4.5 [0.2 - 24.9]	2.0 [0.7 - 8.0]	2.6 [0.2 - 6.1]
Sputum Neutrophils (%)	46.6 ± 18.4	63.2 ± 18.8	61.5 ± 23.6	58.5 ± 27.1	48.5 ± 20.7	61.6 ± 23.3	50.4 ± 19.5	56.5 ± 27.0

* Significant different between the groups (p<0.05) within each sample; mean ± SD; † median [Interquartile Range]; PAL: persistent airflow limitation; OCS: Oral corticosteroids; ACQ: Asthma Control Questionnaire FEV$_1$: Forced Expiratory Volume in the first second

Table 3: Differentially enriched gene signatures in severe asthma patients with PAL as compared to severe asthma patients without PAL.

	Gene signatures associated with	Nasal brush		Sputum		Endobr. Brush		Endobr. Biopsy	
		dES	p-value	dES	p-value	dES	p-value	dES	p-value
Treatment gene signatures	Fluticasone treatment in COPD - DOWN[1]							0.22	0.048
	Fluticasone treatment in asthma – DOWN[1]					0.22	0.012		
Immunologic gene signatures	Eosinophils – UP[1]			0.21	0.040				
	IL13 (Type-2 High) – UP[1]	0.27	0.045						
	IFN-alpha – UP[1]			-0.32	<0.001				
	RA in CD4 T-cells – UP[2]							0.21	0.029
Induced lung injury gene signatures	Induced inflammation (Poly I:C - 2h) – UP[3]			-0.21	0.018				
	Induced inflammation (Poly I:C - 6h) – UP[3]			-0.23	<0.001				
	Induced inflammation (Poly I:C - 48h) – UP[3]			-0.23	<0.001				
	Induced inflammation (Poly I:C - 72h) – UP[3]			-0.25	0.001				
	Induced inflammation (Poly I:C - 96h) – UP[3]			-0.22	0.003				
	Induced injury (Bleomycin - Day 1) – UP[3]			-0.24	0.012			0.22	0.044
	Induced injury (Bleomycin - Day 2) – UP[3]			-0.20	0.006				
	Induced injury (Bleomycin - Day 28) – DOWN[3]							-0.41	0.026

Differences in mean gene signature enrichment scores between severe asthma patients with PAL as compared to those without PAL (in RED are higher and in BLUE are lower). [1]In vitro model in human sample; [2]In vivo model in human sample; [3]In vivo model in murine model

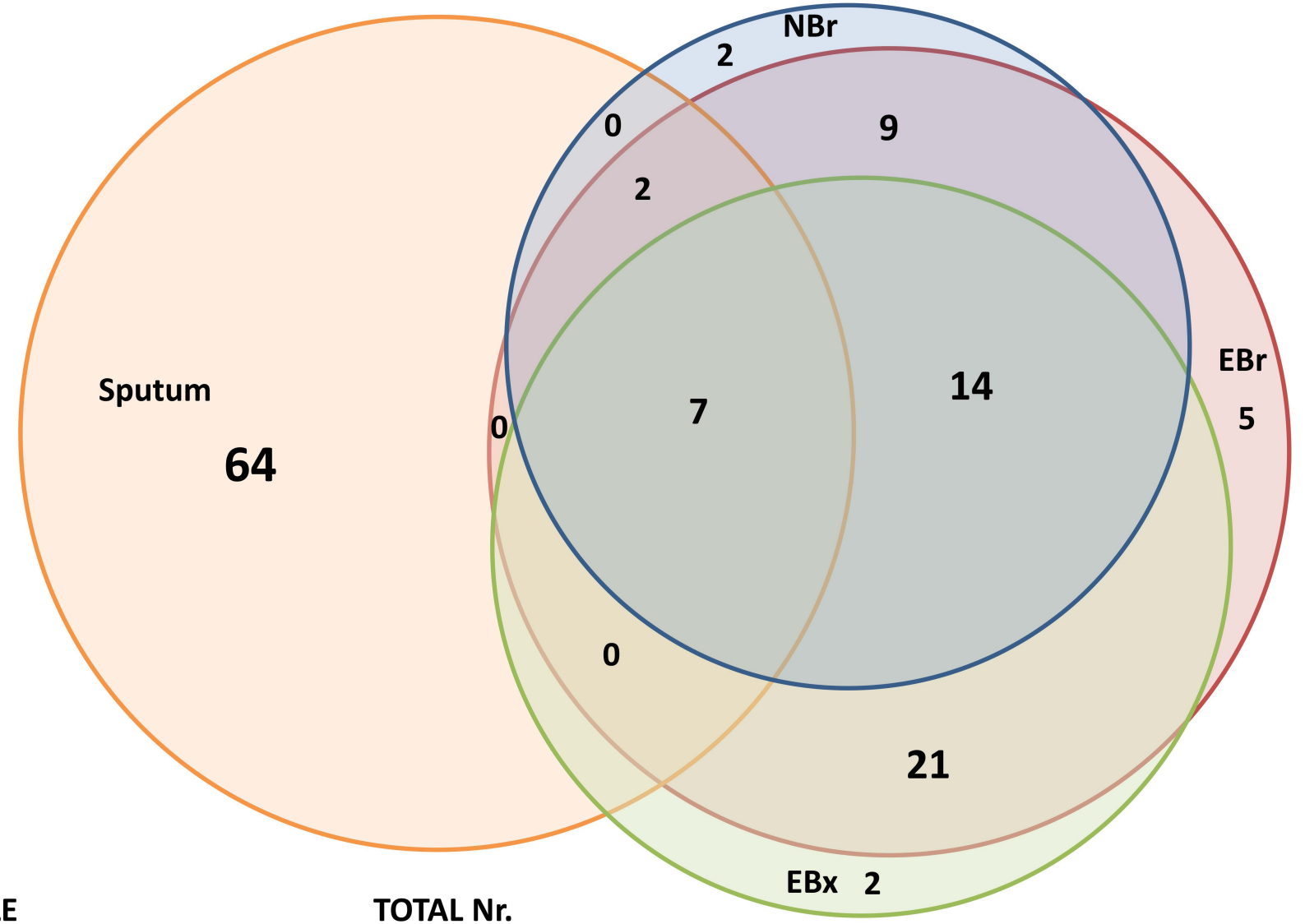
Figure 1: Venn diagram indicating the overlap between the samples.

Figure 2: Significant gene signatures identified in nasal brushing samples. GSVA: Gene Set Variation Analysis; PAL: Persistent airflow limitation

Figure 3: Significant gene signatures identified in sputum samples. GSVA: Gene Set Variation Analysis; PAL: Persistent airflow limitation

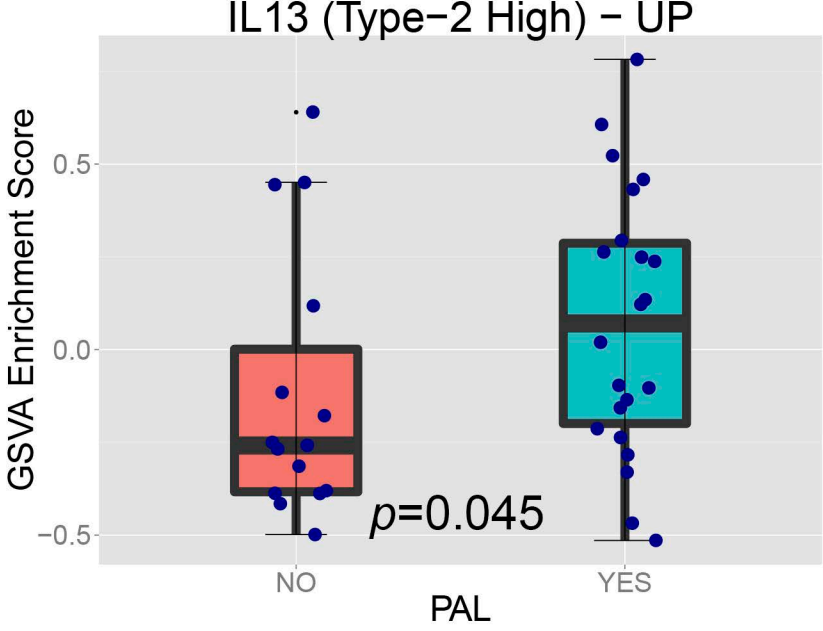
Figure 4: Significant gene signatures identified in endobronchial brushing samples. GSVA: Gene Set Variation Analysis; PAL: Persistent airflow limitation

Figure 5: Significant gene signatures identified in endobronchial biopsy samples. GSVA: Gene Set Variation Analysis; PAL: Persistent airflow limitation

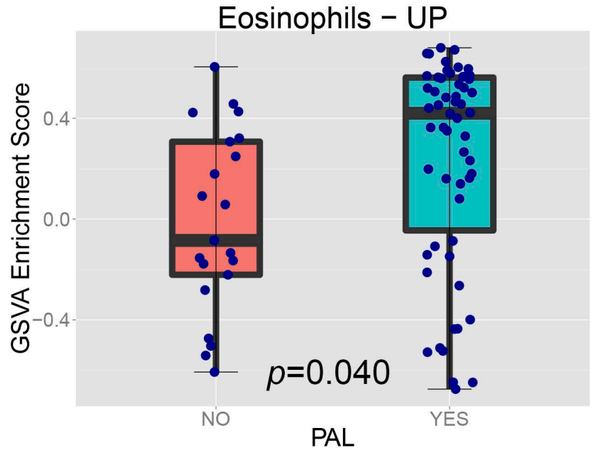


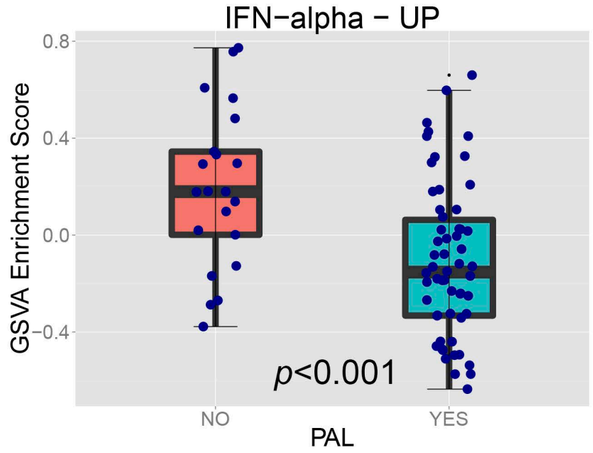
SAMPLE	TOTAL Nr.
Nasal Brush (NBr)	37
Sputum	79
Endobronchial Brush (EBr)	62
Endobronchial Biopsies (EBx)	50

Treatment gene signatures

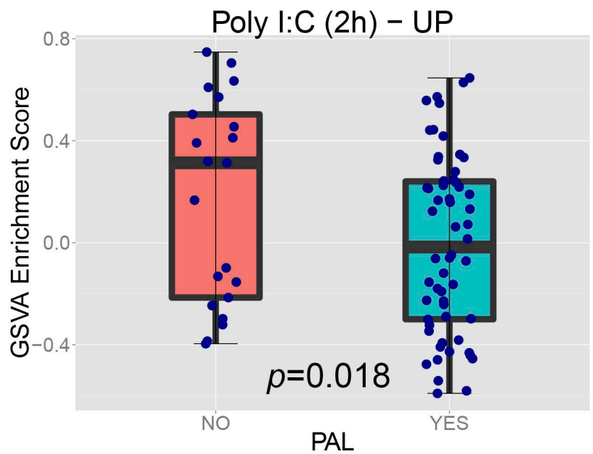


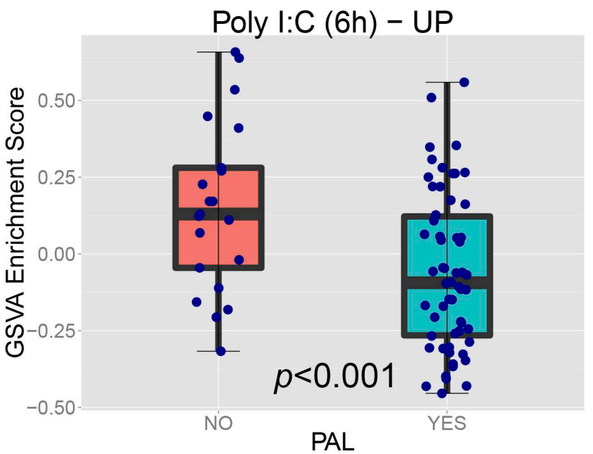
Immunologic gene Signatures

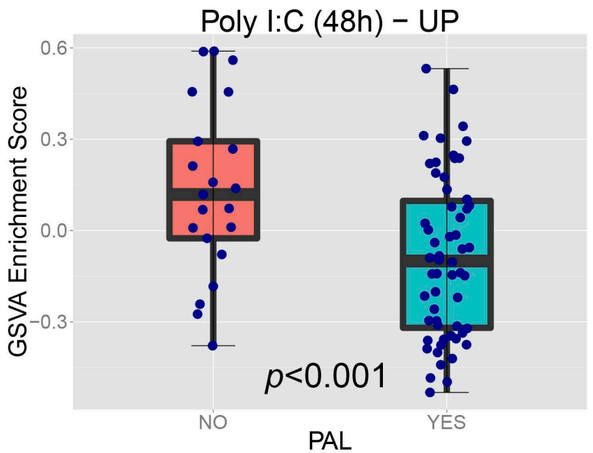


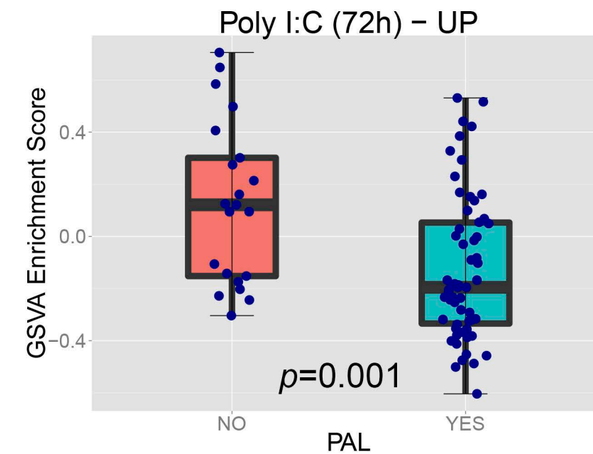


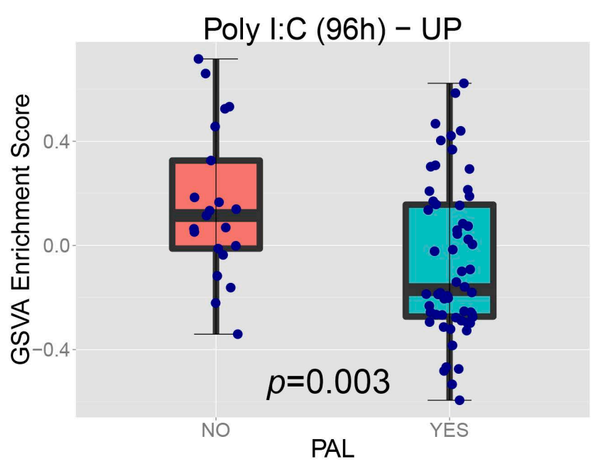
Induced Lung injury Gene Signatures

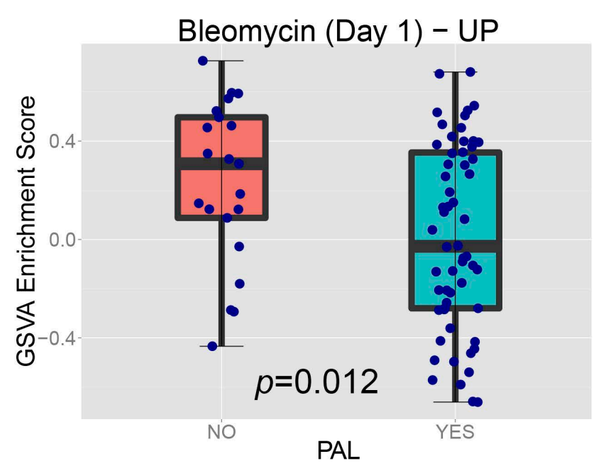


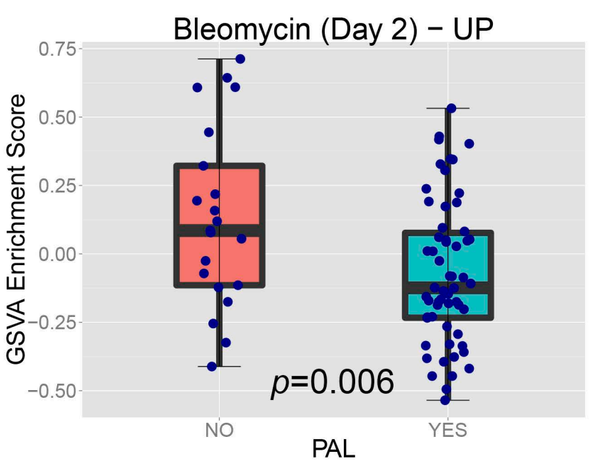




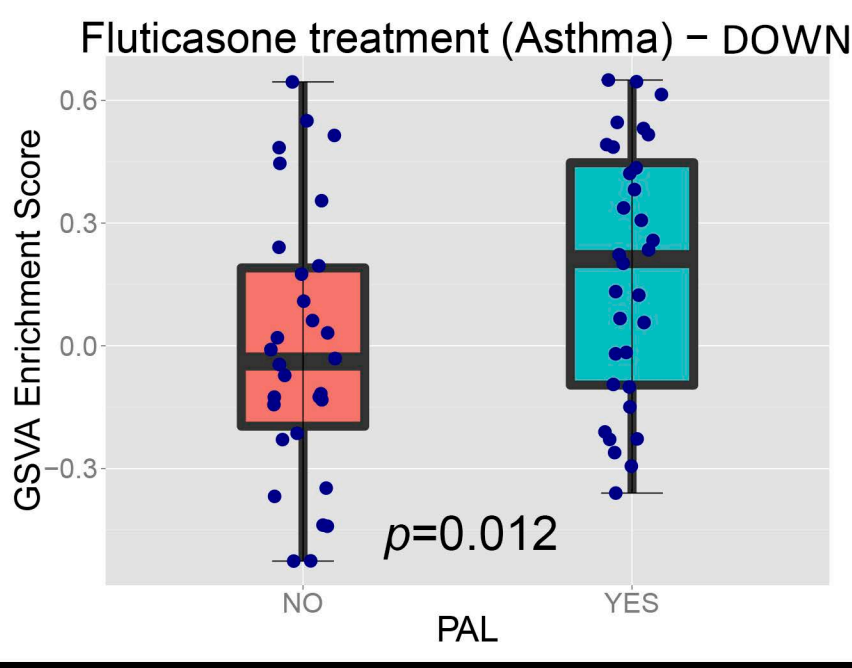




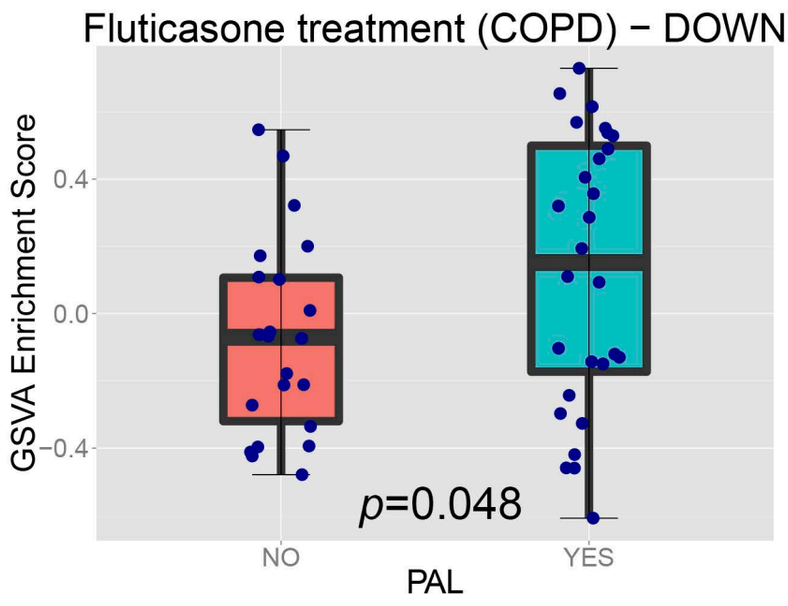




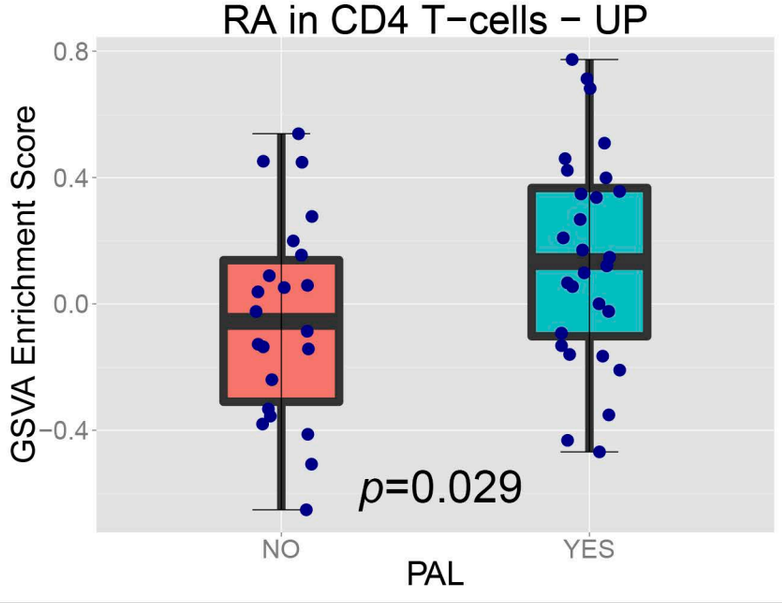
Treatment Gene Signatures



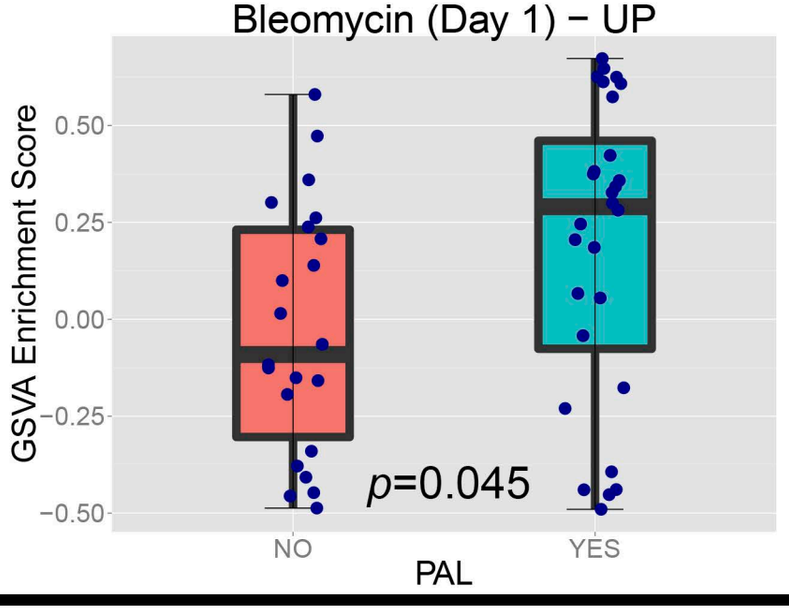
Treatment Gene Signatures

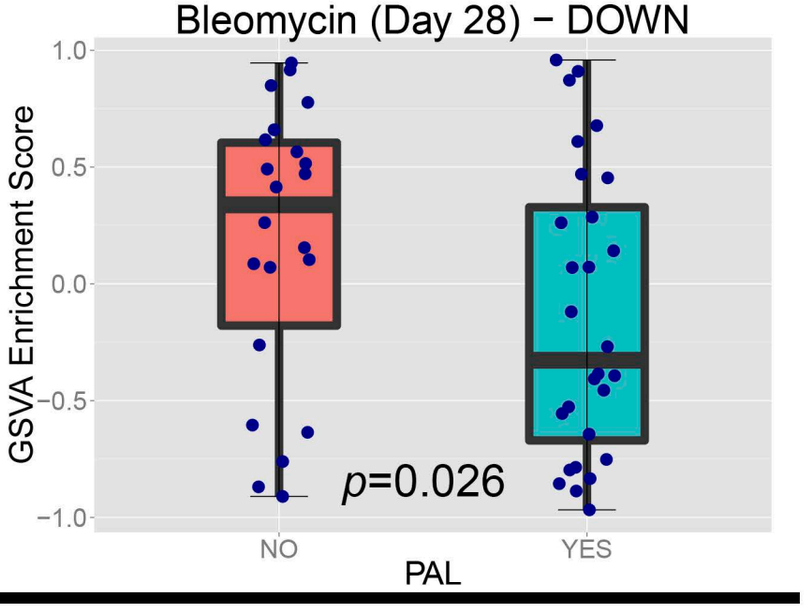


immunologic Gene Signatures



Induced Lung injury Gene Signatures





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Design and subjects

During the baseline visit data on demographics, medical history, physical examination and lung function were collected to assess inclusion criteria and severity of asthma. Subsequently, questionnaires were completed, atopy status was assessed and blood and sputum collected. Finally, nasal brushings and endobronchial biopsies were collected in a separate visit.

Severe asthma was defined according to the IMI consensus statement [E1], and thereby, patients were included who had a confirmed diagnosis of asthma that was uncontrolled despite high intensity asthma treatment (≥1000µg Fluticasone eq. plus a second controller) or could only be controlled with treatment by systemic oral corticosteroids (OCS) or omalizumab. Uncontrolled asthma was diagnosed if ≥3 of the following features were present: 1) >2 weekly daytime symptoms, 2) any limitations of activities, 3) ≥1 weekly nocturnal symptoms 4) >2 weekly need for reliever medication, 5) pre bronchodilator FEV1 <80% predicted or personal best, or if the patient encountered ≥2 yearly severe exacerbations. Current-smokers, ex-smokers and never-smokers were included.

PAL was diagnosed in patients with a post-bronchodilator FEV1/FVC < lower limit of normal (LLN). The LLN was calculated for each patient according to formulae stated by Quanjer *et al.* [E2] (for male subjects: -0.18*AGE + 75.41; for female subjects: -0.19*AGE + 78.4) consistent to LLN defined by Global Lung Function Initiative (GLI) [E3]. In order to examine consistency with other criteria for PAL we additionally performed an analysis based on PAL defined by post-bronchodilator FEV_1 < LLN. The U-BIOPRED study was registered at ClinicalTrials.gov identifier NCT01976767 and was approved by the Medical Ethics Boards of all participating centers. All patients provided written informed consent.

Measurements

Clinical data

Clinical data were collected according to predefined standard operating procedures (SOPs) and details on the methods of collection in U-BIOPRED have been published elsewhere [E4]. First, by history taking data on age, gender, body mass index (BMI), age of onset of asthma, medication and smoking history were assessed. Second, asthma symptoms were obtained by a questionnaire (ACQ)[E5]. Third, lung function was measured pre- and post-bronchodilator and according to standardized procedures [E6]. Fourth, eosinophil and neutrophil counts were assessed in blood and induced sputum samples.

mRNA samples

Gene expression was assessed on the total RNA in unselected samples of severe asthma patients in the following four different airway compartments: (1) nasal brushing (n=37), (2) induced sputum (n=79), (3) endobronchial brushings (n=62) and (4) endobronchial biopsies (n=50). There was no complete overlap between the samples, mainly because of limited sputum induction success rate (Fig. 1).

Sputum induction

Sputum samples, induced by inhalation of hypertonic saline, were processed with 0.1%DTT by using the selected sample technique, quality controlled according to ERS recommendations [E7]. Sputum was processed within 2 hours after collection and processed suspension was preserved in RNAlater® solution and then maintained at -80°C.

Nasal brushing, endobronchial brushing and biopsy

Nasal brushings were collected from one nostril (4mm plastic coated wire interdental brush (DENT.O.CARE Limited, 7 Cygnus Business Centre, Dalmeyer Road, London, UK)). Samples were embedded in phosphate buffer saline (PBS) directly after the procedure. Bronchoscopy procedures were based on U-BIOPRED SOPs and performed according to safety standards [E8]. Patients had refrained smoking ≥6 hours prior to the procedure, and subsequently received bronchodilator medication and local anesthesia. A flexible scope (type of scope depending on preferences of physician and clinical center) was introduced and, first, four endobronchial brushings were performed in a large airway (bronchus intermedius) contacting the wall at least 4 times (with e.g. Olympus REF: BC-202D-2010 (2mm brush size) or BC-202D-3010 (3mm brush size), KeyMed (Medical & Industrial Equipment, Ltd OLYMPUS Group Company)). Subsequently, up to 8 endobronchial biopsies were taken from the 2^{nd} and 4^{th} airway carinae of the right or left lower and middle lobes, working upwards (with a disposable 1.8 mm cupped biopsy forceps). Nasal brushings and endobronchial biopsies and brushings were immediately preserved in RNAlater® solution and then maintained at -80°C. RNA was extracted using Qiagen miRNeasy kit (Qiagen; Germantown, MD) and amplified with NuGen ovation pico WTA kit (NuGen Technologies; San Carlos, CA).

mRNA microarray analysis

Microarray analysis was performed with the Affymetrix HT HG-U133+ PM microarray platform (Affymetrix, Santa Clara, Ca). Pre-processing and quality control were performed with multi-array average normalization (Almac, Craiganvond, UK) and the obtained CEL files were normalized. Technical outliers were excluded (chip image analysis, Affymetrix GeneChip QC, RNA degradation analysis, distribution analysis, principal components analysis, and correlation analysis) and CEL files re-normalized using the robust multi-array (RMA) method. Technical batch effects (e.g., from microarray hybridization date/lot, RNA processing batch) were adjusted in the data matrices using linear modeling of batch (as random factor).

Statistical analysis

Clinical variables were summarized as mean±standard deviation when normally distributed, as median (interquartile range) when skewed and as their frequencies (proportion) when categorical. Between group comparison was performed with independent t-tests, Mann-Whitney U test or chi-square tests, as appropriate. Clinical variables with a $p<0.05$ were considered significantly different.

GSVA

Gene set variation analysis (GSVA) is a statistical technique that allows sensitive identification of differences in expression of sets of genes between heterogeneous groups and can be used to explore for underlying pathways [E9]. Sets of genes were predefined, and were based on the available gene expression publications and data on airways disease, including human and murine models, both *in vivo* and *in vitro* studies, to assure sensitive pathway detection. These included studies on the gene expression associated with (1) airway disease treatment, (2) immunologic pathways and (3) induced lung injury or inflammation. The latter included gene signatures that were identified at several time points after the admission of either Poly(I:C) as a model for exacerbations [E10], or bleomycin, which is used as a model for mimicking the course of fibrotic processes in the lung [E11]. For this discovery study 105 predefined gene sets were entered into the statistical models (Table E7).

Enrichment scores and false discovery

Enrichment scores (ES) were calculated for each patient and for each of the gene signatures and were based on the gene expression of genes in the sets. ES could range from a value of -1 to 1 [E9]. Subsequently, mean ES were calculated for patients with PAL and patients without PAL and Generalized Linear Models, including correction for smoking status, corticosteroid usage and duration of asthma, were applied to statistically compare ES between the groups. In order to minimize false discovery, only gene signatures that had $p<0.05$ and a difference of ES (dES) between

of the groups of ≥0.2 were considered significantly different, following the Microarray Consortium for Quality Control (MACQC) recommendations regarding the need for applying group-difference thresholds in order to stringently limit false discovery [E12].

Consistency when using different definition of PAL

211 out of 421 patients (50.1%) were having PAL defined as FEV_1 < LLN. Patient characteristics were similar in both analyses, however patients with PAL defined as FEV_1 < LLN were also more frequent female and had a higher ACQ score (Table E5).

GSVA analysis showed that identified signatures between FEV_1/FVC < LLN and FEV_1 <LLN were also similar, including those associated with treatment with fluticasone, eosinophilic inflammation and involvement of T_H2 helper cells and IFN-alpha. In addition, induced lung injury and inflammation gene signatures were identified in both analyses as well (Table E6). However, involvement of CD4 T-cells of rheumatoid arthritis was not consistent, and no significant gene signatures were identified in the biopsies applying FEV_1 < LLN.

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Table E1: Patient Characteristics of Nasal Brushings sample

	No PAL	PAL	*P*-Value
n	15	22	
Gender = Female (%)	**11 (73.3%)**	**8 (36.4%)**	**0.045**
Age (yrs)*	47.5 ± 16.2	53.2 ± 12.1	0.229
BMI (Kg/m^2)*	34.1 ± 6.6	29.4 ± 5.7	0.027
Asthma Duration (yrs)*	25.0 [14.0 - 38.0]	21.5 [17.0 - 40.5]	0.914
Smoking Status (%)			0.188
Never Smokers	12 (80.0)	11 (50.0)	
Ex-smokers	3 (20.0)	8 (36.4)	
Current-smokers	0 (0.0)	3 (13.6)	
Packyears†	5.0 [3.3 - 5.1]	20.0 [11.5 - 38.5]	0.052
OCS dose (mg)†	10.0 [8.0 - 25.0]	10.00 [8.12, 13.75]	0.616
ACQ*	1.9 ± 1.0	2.2 ± 1.2	0.414
Exacerbations per year†	2.0 [1.0 – 4.0]	3.0 [1.0 - 4.0]	0.982
pbFEV$_1$ (% predicted)*	**99.4 ± 17.6**	**71.5 ± 14.9**	**<0.001**
Blood Eosinophils (x10^3/L)†	0.2 [0.1 - 0.4]	0.2 [0.1 - 0.3]	0.817
Blood Neutrophils (x10^3/L)†	**3.8 [3.6 - 5.1]**	**5.0 [4.2 - 7.8]**	**0.033**
Sputum Eosinophils (%)†	1.4 [0.4 - 4.6]	2.6 [0.2 - 13.8]	0.614
Sputum Neutrophils (%)*	46.6 ± 18.4	63.2 ± 18.8	0.053

* mean ± SD; † median [Interquartile Range]; PAL: persistent airflow limitation; OCS: Oral corticosteroids; ACQ: Asthma Control Questionnaire FEV$_1$: Forced Expiratory Volume in the first second

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Table E2: Patient Characteristics of sputum sample

	No PAL	PAL	*P*-Value
n	21	58	
Gender = Female (%)	13 (61.9%)	35 (60.3%)	1.000
Age (yrs)*	52.5 ± 13.9	54.2 ± 11.4	0.580
BMI (Kg/m^2)*	28.2 ± 5.0	28.1 ± 5.3	0.928
Asthma Duration (yrs)*	23.1 ± 14.5	26.8 ± 17.2	0.374
Smoking Status (%)			0.799
Never Smokers	11 (52.4%)	35 (60.3%)	
Ex-smokers	8 (38.1%)	18 (31.0%)	
Current-smokers	2 (9.5%)	5 (8.6%)	
Packyears†	13.8 [2.9 - 19.7]	10.0 [2.8 - 18.8]	0.922
OCS dose (mg)†	10.0 [8.8 - 12.5]	10.0 [6.9 - 13.1]	0.691
ACQ*	2.6 ± 1.4	2.6 ± 1.3	0.914
Exacerbations per year†	2.0 [2.0 – 3.5]	2.0 [1.5 – 4.0]	0.833
pbFEV$_1$ (% predicted)*	**90.2 ± 14.0**	**63.5 ± 19.9**	**<0.001**
Blood Eosinophils (x10^3/L)†	0.2 [0.2 - 0.3]	0.4 [0.2 - 0.5]	0.203
Blood Neutrophils (x10^3/L)†	4.3 [3.3 - 6.3]	5.0 [3.9 - 7.5]	0.051
Sputum Eosinophils (%)†	**1.3 [0.2 - 3.8]**	**6.2 [1.3 - 28.5]**	**<0.001**
Sputum Neutrophils (%)*	61.5 ± 23.6	58.5 ± 27.1	0.663

* mean ± SD; † median [Interquartile Range]; PAL: persistent airflow limitation; OCS: Oral corticosteroids; ACQ: Asthma Control Questionnaire FEV$_1$: Forced Expiratory Volume in the first second

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Table E3: Patient Characteristics of endobronchial brushings sample

	No PAL	PAL	*P*-Value
n	30	32	
Gender = Female (%)	**19 (63.3)**	**10 (31.2)**	**0.021**
Age (yrs)*	46.7 ± 14.0	53.0 ± 11.1	0.052
BMI (Kg/m^2)*	31.3 ± 6.3	28.5 ± 6.1	0.081
Asthma Duration (yrs)*	26.4 ± 16.8	26.7 ± 17.9	0.940
Smoking Status (%)			0.077
Never Smokers	22 (73.3)	15 (46.9)	
Ex-smokers	7 (23.3)	12 (37.5)	
Current-smokers	1 (3.3)	5 (15.6)	
Packyears†	**5.1 [1.4 - 8.1]**	**18.8 [7.0 - 24.0]**	**0.031**
OCS dose (mg)†	10.0 [10.0 - 21.3]	10.0 [6.5 - 16.3]	0.246
ACQ*	2.1 ± 1.2	2.4 ± 1.0	0.314
Exacerbations per year†	2.0 [2.0 – 4.0]	3.0 [2.0 – 4.0]	0.768
pbFEV$_1$ (% predicted)*	**91.9 ± 14.3**	**66.7 ± 15.5**	**<0.001**
Blood Eosinophils (x10^3/L)†	0.2 [0.1 - 0.4]	0.2 [0.1 - 0.3]	0.319
Blood Neutrophils (x10^3/L)†	**4.0 [3.2 - 5.4]**	**5.8 [4.1 - 7.7]**	**0.005**
Sputum Eosinophils (%)†	1.4 [0.6 - 4.6]	4.5 [0.2 - 24.9]	0.520
Sputum Neutrophils (%)*	48.5 ± 20.7	61.6 ± 23.3	0.143

* mean ± SD; † median [Interquartile Range]; PAL: persistent airflow limitation; OCS: Oral corticosteroids; ACQ: Asthma Control Questionnaire FEV$_1$: Forced Expiratory Volume in the first second

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Table E4: Patient Characteristics of endobronchial biopsies sample

	No PAL	PAL	*P*-Value
n	22	28	
Gender = Female (%)	14 (63.6%)	12 (42.9%)	0.166
Age (yrs)*	48.4 ± 12.6	52.7 ± 11.2	0.212
BMI (Kg/m^2)*	30.2 ± 5.4	28.6 ± 6.4	0.344
Asthma Duration (yrs)*	25.8 ± 15.5	30.5 ± 18.7	0.353
Smoking Status (%)			0.245
Never Smokers	16 (72.7%)	16 (57.1%)	
Ex-smokers	5 (22.7%)	6 (21.4%)	
Current-smokers	1 (4.5%)	6 (21.4%)	
Packyears†	**5.3 [2.0 - 13.4]**	**21.5 [18.0 - 27.5]**	**0.049**
OCS dose (mg)†	10.0 [7.9 - 10.0]	10.0 [6.0 - 15.0]	0.966
ACQ*	2.3 (1.3)	2.4 (1.1)	0.721
Exacerbations per year†	2.0 [2.0 – 3.3]	3.0 [2.0 – 4.0]	0.249
pbFEV$_1$ (% predicted)*	**89.6 ± 13.6**	**68.3 ± 15.2**	**<0.001**
Blood Eosinophils (x10^3/L)†	0.2 [0.1 - 0.3]	0.2 [0.1 - 0.3]	0.683
Blood Neutrophils (x10^3/L)†	4.0 [3.5 - 5.3]	5.0 [4.3 - 7.3]	0.050
Sputum Eosinophils (%)†	2.0 [0.7 - 8.0]	2.6 [0.2 - 6.1]	0.938
Sputum Neutrophils (%)*	50.4 ± 19.5	56.5 ± 27.0	0.518

* mean ± SD; † median [Interquartile Range]; PAL: persistent airflow limitation; OCS: Oral corticosteroids; ACQ: Asthma Control Questionnaire FEV$_1$: Forced Expiratory Volume in the first second

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Table E5: Patient characteristics of patients with persistent airflow limitation (PAL) defined as post-bronchodilator FEV1 < LLN

	no PAL	PAL	*P*-value
n	**210**	**211**	
Female (%)	**118 (56.2)**	**143 (67.8)**	**0.016**
Age (yrs)*	**49.7 ± 14.8**	**54.1 ± 11.6**	**0.001**
BMI (Kg/m2)*	29.3 ± 6.3	29.2 ± 6.3	0.825
Asthma Duration (yrs)†	**20.0 [11.0 - 30.0]**	**26.0 [13.3 - 41.8]**	**<0.001**
Smoking history (%)			0.832
Never	133 (63.3)	131 (62.1)	
Ex-smoker	58 (27.6)	57 (27.0)	
Current smoker	19 (9.0)	23 (10.9)	
Packyears†	12.5 [4.5 - 20.0]	12.7 [3.8 - 21.4]	0.975
OCS dose†	12.8 ± 8.6	14.3 ± 10.6	0.345
ACQ*	**2.3 ± 1.3**	**3.0 ± 1.2**	**<0.001**
Exacerbations per year †	2.0 [1.0 - 4.0]	2.0 [2.0 - 3.0]	0.568
pbFEV1 (% pred)*	**91.5 ± 13.6**	**60.2 ± 15.1**	**<0.001**
Blood Eosinophils (x109/L)†	0.2 [0.1 - 0.4]	0.2 [0.1 - 0.4]	0.950
Blood Neutrophils (x109/L)†	4.9 [3.8 - 6.4]	4.8 [3.6 - 7.3]	0.969
Sputum Eosinophils (%)†	2.0 [0.4 - 9.6]	3.8 [1.0 - 20.7]	0.099
Sputum Neutrophils (%)*	51.7 [31.5 - 72.8]	56.5 [37.4 - 74.4]	0.298

* mean ± SD; † median [Interquartile Range]; PAL: persistent airflow limitation; OCS: Oral corticosteroids; ACQ: Asthma Control Questionnaire; FEV_1: Forced Expiratory Volume in the first second

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Table E6: Differentially enriched gene signatures in severe asthma patients with FEV1 post-bronchodilator < LLN as compared to severe asthma patients without FEV1 post-bronchodilator < LLN

	Gene signatures associated with	Nasal brush		Sputum		Endobr. Brush		Endobr. Biopsy	
		dES	p-value	dES	p-value	dES	p-value	dES	p-value
Treatment gene signatures	Fluticasone treatment in asthma - DOWN[1]*					0.23	0.007		
	Fluticasone treatment in asthma - UP[1]*					0.23	0.009		
	Asthma (HDM induced model) - UP[3]					0.21	0.009		
Immunologic gene signatures	Eosinophils - UP[1]*			0.37	0.001	0.21	0.039		
	TH2 activated - DOWN[2]*	-0.21	0.033						
	IFN-alpha - UP[1]*			*-0.19*	0.011				
Induced lung injury gene signatures	Induced inflammation (Poly I:C - 72h) - UP[3]*			-0.21	0.002				
	Induced injury (Bleomycin - Day 2) - UP[3]*			*-0.19*	0.003				

Differences in mean gene signature enrichment scores between severe asthma patients with FEV1 post-bronchodilator < LLN as compared to severe asthma patients without FEV1 post-bronchodilator < LLN (in RED are higher and in BLUE are lower). * Comparable results as found in PAL defined as Fev1/FVC < LLN; [1]In vitro model in human sample; [2]In vivo model in human sample; [3]In vivo model in murine model

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Table E7: Details on significantly different enriched gene signatures						
#	**Tissue**	**Species**	**Trigger**	**Direction**	**Gene Set**	**Source**
12	**Bronchial epithelia**	**HS**	Fluticasone in asthma	DOWN	TFCP2L1, HBB, MUC13, POSTN, SERPINB2	http://www.ncbi.nlm.nih.gov/pubmed/17898169
27	**Peripheral blood - CD4 Tcells**	**HS**	Rheumatoid Arthritis	UP	BCL3, SOCS3, PIM1, SBNO2, LDHA, CMAHP, PDCD1, IGFL1, LOC731186, MUC1, GPRIN3	http://www.ncbi.nlm.nih.gov/pubmed/22532634
34	**Lung biopsy**	**HS**	Fluticasone in COPD	DOWN	TMPRSS11D, SERPINB13, SPINK5, KRT4, TMPRSS11A, CSTA, GABRP, TYMS, GPR87, TMPRSS4, ATP10B, CH25H, SRPX2, IGKC, BNIPL, RAB38, CAPNS2, FANCD2, ABCC1, TENM2, BNC1, KLK10, PTAFR, CRABP2, TENM4, TRIM16, EYA2, GNA15, SMAGP, BICD2, EXOSC7, SCO1, BID, RHNO1, ITPA, TSPAN17	http://www.ncbi.nlm.nih.gov/pubmed/23925644
36	**Peripheral blood**	**HS**	Systemic lupus erythematosus (SLE) and PBMC	UP	IFI35, IRF7, MX1, MX2, XIAP, IFI44L, OAS2, LY6E, AGRN, IFIT1, RSAD2, ISG15, IFIT3, CCL2, TDRD7, PLSCR1, ACSL1, TNFSF10, OAS1, GBP1, SERPING1, FCGR1A, C2, TYMP, STAT1, LAMP3, LGALS3BP, IFITM3, TAP1, IFI6, APOBEC3F, APOBEC3C, APOBEC3B, APOBEC3A, APOBEC3D, APOBEC3G, G6PD	http://www.ncbi.nlm.nih.gov/pubmed/12642603
55	**Eosinophils (BAL)**	**HS**	Mild Asthma, Whole Lung	UP	ADAM28, CNR2, FFAR3, LGALS12, PRSS33, SPNS3, ADAM8, CORO1A, FHL3, LTC4S, RAB37, TESC, ARAP3, CYP4F12, GGT5, MCTP2, RAB3D, TNFSF14, ASB2, DACH1, GPR56, MMP25, RD3,	http://www.ncbi.nlm.nih.gov/pubmed/23844029

			Allergen Challenge		TREML2, ATP2A3, DAPK2, GPR97, NHSL2, RNASE2, TRPM6, CASS4, DGKD, ICAM3, P2RY2, RNASE3, TSPAN18, CD300LB, EMP4P, IFITM1, PADI2, SIGLEC10, VSTM1, CD69, FAM101B, IL1RL1, PADI4, SIGLEC8, CDA, FAM65B, IL5RA, PGLYRP1, SLC24A3, CHST15, FFAR2, KIF21B, PIK3R6, SORL1	
57	**Lung biopsy**	**MM**	Poly(I:C) - 2hr	UP	CXCL10, IFIT1B, MX1, MX1, OASL, IFIT2, CMPK2, HAS2, RSAD2, HAS1, RSAD2, CXCL11, CSF1, TNFAIP6, IFIT1B, GBP2, RSAD2, RTP4, IRGM, RND1, GBP4, RTP4, IFIH1, IRGM, CMPK2, HAS2, CXCL9, IRGM, IFNB1, CSF1, IL6, ADAMTS4, STAT1, PTX3, GEM, TNFAIP3, PARP14, GBP6, ADAMTS4, DDX58, PYHIN1, FAM26F, TNFAIP2, USP18, MMP13, CCL4, CCL8, CCL11, PYHIN1, MT1H, PLSCR2, TNFAIP3, VCAM1, ADM, CXCL11, C12orf75, ATF3, CP, CCL20, CXCL9, TIMP1, SLFN11, HPX, SAA1, IFI44L, CCL22, NTS, CH25H, IRG1, IFI44L, FGG, MT1A, RGS16, CXCL3, CXCL3, CXCL3, CXCL6, CXCL8, LEP,	http://www.ncbi.nlm.nih.gov/pubmed/22990623
58	**Lung biopsy**	**MM**	Poly(I:C) - 6hr	UP	NHLH1, CMPK2, IFIT2, CMPK2, GBP4, MX1, RSAD2, TOR3A, CD274, HERC6, DDX58, HERC6, HERC6, SAMD9L, STAT1, HERC6, GBP4, GBP2, GBP4, RNF213, MX1, ZNFX1, MITD1, PARP14, CXCL10, IRGM, GBP2, SETDB2, STAT1, IFIT1B, EIF2AK2, ENPP4, WARS, IRGM, IRGM, ATM, ASB13, WDR19, OASL, PML, PML, TLR3, IFIH1,	http://www.ncbi.nlm.nih.gov/pubmed/22990623

					RTP4, TOR3A, IFIT1B, SLFN11, ASB13, DDX60, STAT2, PARP11, TRIM5, STAT2, STAT1, TOR3A, TRIM6, RBL1, CXCL11, WDR19, DDX58, PARP9, TRIM21, USP18, WARS, DDX60, GBP2, DTX3L, IL15, GBP6, ENPP4, SLFN11, SECTM1, ADAR, MLKL, XAF1, RSAD2, INPP1, ZUFSP, WARS, MITD1, TRAFD1, RTP4, DHX58, UBE2L6, IDO1, LY6E, STAT1, IFI35, RSAD2, TRIM34, NAMPT, GNB4, CXCL9, NMI, IFI35, CXCL9, PLSCR2, PNPT1, HAS2, TRIM14, NLRC5, CXCL11, PYHIN1, DDX58, IRF9, HAP1, ZBP1, BATF2, IRF7, PYHIN1, DTX3L, DAXX, ZBP1, IFI44, KATNA1, SPATS2L, ADAR, Mar-05, PNP, NCOA7, SLFN5, FAM26F, SP100, IFI44L, RAB19, CX3CL1, ZNF836, PLEKHA4, SLFN11, ISG20, MISP, IFI44L, SERPINA3, CD40, SPPL2A, IFNB1, AIM1, MMP13, UBA7, ADAR, VCAM1, ZC3HAV1, SPATS2L, IFI44L, ATM, TOR1AIP2, TTC39B, DHX58, TMEM171, MOV10, CD40, PAPD7, TNFAIP6, SLFN12, PSMB8, LGALS9C, PARP14, ASAP3, TTC39B, HAS2, PSMB9, TAPBPL, ZSWIM5, CCRL2, CD40, CASP4, ATP10A, AREL1, DCP2, IL6, CCL5, UPP1, SLFN5, ECE2, APOL6, GCH1, CTRL, SP100, CX3CL1, CSF1, LAG3, IL18BP, TTC39B, TMEM106A, PNPT1, SPATS2L, TRIM25, RNF114, PLAC8, FCGR1A, SLC15A3, USP25, NAMPT, SLFN12, EPSTI1, GGT5, XAF1, CD69, CACNB4, SOCS1, MS4A4A, TLR2, ATF3, OAS3, SAMHD1, PYHIN1, GCH1, PPP1R14D, ASB13, TRIM5, LYPD8, NFKBIE,	

					ARHGAP8, CSF1, CASP1, ZC3HAV1, PLA1A, BRIP1, CD86, SOCS1, CCL8, LGALS3BP, OSMR, CCL4, ETNK1, OAS2, TIFA, EPSTI1, ARID5A, PPA1, XDH, TNFAIP3, CNR1, NFKBIE, MS4A4A, ERVFRD-1, CA13, PARP11, MARCKSL1, VCAM1, GLIPR2, LRRC4, SECTM1, GEM, RND1, PTX3, ARSI, AFTPH, NPC2, VCAN, GLIPR2, DNASE1L3, ABTB2, MS4A6A, SLC2A6, CA13, FRAS1, PAPSS2, MXD1, HSPBAP1, B2M, FAP, SLFN5, PCGF5, VCAM1, EPSTI1, MB21D1, ADAMTS4, PTPN2, IFNG, FCGR1A, GZMB, VCAN, POU3F1, CA13, TFPI2, TNFAIP3, VNN1, PML, IAPP, UBD, IRG1, ADAMTS6, IAPP, IAPP, RTN4RL2, DCK, TNFAIP2, RGS1, BCL3, CSRNP1, SLFN12, ADAMTS4, MT1H, KLRK1, VNN1, MSR1, IL12B, CH25H, NTS, CCL22, PYHIN1, IL1RN, TNF, CP, SOCS3, RAD54B, CCR2, TIMD4, TIMP1, XCL2, NAV3, IFITM1, HPX, DDX4, MS4A6A, GZMA, DCK, FCGR3B, CXorf21, NCR2, GPR84, MBD1, MSR1, IL1RN, SELP, IL1RN, MSR1, NCR1, SAA1, SLFN12, CCL3L1, MT1A, CXCL3, FGG, CXCL3, RGS16, CXCL3, ORM2, C15orf48, CXCL8	

62	**Lung biopsy**	**MM**	Poly(I:C) - 48hr	UP	IRF7, APOD, ZBP1, IFI44L, CXCL10, GBP4, PYHIN1, PYHIN1, ZBP1, IFI44, CXCL9, IFIT1B, CXCL11, LY6E, LGALS3BP, USP18, DDX60, SIGLEC1, GBP6, RTP4, LAIR2, MX1, IFI44L, BST2, MX1, RTP4, MS4A6A, XAF1, C3AR1, DDX60, SLAMF9, C3AR1, CMPK2, STAT1, CCR2, FCGR1A, OASL, IFIT2, MS4A4A, FCGR1A, OAS3, C3AR1, LAIR2, IL18BP, OAS2, AIF1, DHX58, LAIR2, CCR2, IRGM, HERC6, TM4SF5, APOC2, SLFN12, MS4A7, CNGB3, MS4A4A, MS4A6A, HERC6, IFI44L, APOBEC1, CCR2, FCGR2A, HERC6, RSAD2, PLA1A, MSR1, CXCL9, GDF3, TIMP1, IL12B, RSAD2, SLFN11, CLEC4A, CCR2, SIRPG, HERC6, B2M, SAA1, IFI27, NLRC5, CLEC4A, CCR2, FCGR2A, EPSTI1, CCL5, CLEC5A, BEX4, CCR2, CD72, SLFN12, MSR1, EPSTI1, TRIM5, MILR1, STAT1, XCL2, FCGR2A, FCGR2A, LPXN, DCK, GPR114, GPR65, MSR1, LST1, VNN1, DHX58, FAM26F, RSAD2, CCR1, MSR1, SAA4, CCL4, CCL8, NCR2, CXCL3, PYHIN1, CCR9, KLRK1, GZMK, IRG1, HAVCR1, PARP14, CCR2, MS4A7, RGS1, CXCL3, CXCL3, KLK1, CH25H, FYB, CXorf21, HPX, GPR35, CD180, FCGR3B, CXCL13, SLFN12, IL6, TLR1, KLK1, CXCL6, ORM2, TNFRSF9, CA13, KLK1, KLRB1, GZMB, C15orf48, EMR3, RGS16, CXCL13, ADAMTS4, CYBB, CXCL11, IL1RN, RFPL3, SLC26A4, CXCL8, UBD, CCL3L1, IFNG, IL1RN, ORM2	http://www.ncbi.nlm.nih.gov/pubmed/22990623

64	**Lung biopsy**	**MM**	Poly(I:C) - 72hr	UP	IRF7, APOD, CCNA1, PYHIN1, IFI44L, TOMM20L, PYHIN1, IFI44, IFI27, IFI44L, IFIT1B, MS4A7, OAS2, CXCL10, MX1, DDX60, ZBP1, CCR2, C3AR1, ZBP1, SPAG5, CXCL9, SAA1, CCDC67, CCR2, FCGR1A, KLK1, KLK1, OAS3, MX1, MS4A4A, SRSF11, NCAPG, CDK10, CEP55, MS4A4A, CCR2, ESCO2, CCR2, OASL, RGS1, SLFN12, IL12B, KLK1, ORM2, CXCL11, CXCL8, IRG1, CXCL3, CXCL3, CXCL3, SLC26A4, AGR2, CLCA1	http://www.ncbi.nlm.nih.gov/pubmed/22990623
65	**Lung biopsy**	**MM**	Poly(I:C) - 96hr	UP	APOD, IRF7, MS4A7, PYHIN1, C3AR1, C3AR1, CCL8, CCR2, MS4A7, PYHIN1, CCR2, C3AR1, CCNA1, IFI44L, SPAG5, TOMM20L, MX1, CDK10, CXCL9, IFI27, IL12B, SAA1, CEP55, OAS2, HAL, IFI44L, ESCO2, CXCL10, RGS1, HMMR, CH25H, CXCL11, ESCO2, C15orf48, ORM2, CXCL8, IRG1, AGR2	http://www.ncbi.nlm.nih.gov/pubmed/22990623
67	**Lung biopsy**	**MM**	Bleomycin - 1day	UP	GDF15, AEN, CCNG1, CDKN1A, EDA2R, CELF5, DDIAS, PSRC1, THEM5, PSAPL1, SAA1, CXCL3, CXCL10, RSAD2, ORM2, CCL20, CXCL6, TIMP1, CXCL8, CCL8, SLC26A4, IL6, ADAMTS4, CXCL9	http://www.ncbi.nlm.nih.gov/pubmed/23565148
68	**Lung biopsy**	**MM**	Bleomycin - 2days	UP	HERC6, VCAN, RSAD2, MX1, IFIT1B, DHX58, IFI44, IRF7, CXCL11, CXCL10, OAS3, FCGR1A, GDF15, MS4A6A, CXCL8, ZBP1, OASL, CYP7B1, DDIAS, SAA1, EDA2R, OAS2, APOD, SERPINA3, CELF5, CXCL3, TIMP1, PSRC1, CCL8, SECTM1, C15orf48, CCR2, CH25H, ORM2, MSR1, FOSL1, IRG1, CXCL6, SPINK1, LIF, SLFN12, IL6, CXCL9, IL1RN, EREG,	http://www.ncbi.nlm.nih.gov/pubmed/23565148

					MORC1, CXCL13, TNC, CHL1, CD177, BCAT1, ADAMTS4, SPRR1B,	
77	**Lung biopsy**	**MM**	Bleomycin - 28days	DOWN	BEX2, TMEM132D, SLC4A1, FABP1, TBX20, KCNJ3, TRDN	http://www.ncbi.nlm.nih.gov/pubmed/23565148
101	**Lung brushings**	**HS**	IL-13	UP	ADAMTS9, ALOX15, BCL2L15, C1QTNF1, CA2, CCBL1, CCL26, CD274, CD44, CDH26, CISH, CST1, CST2, CST4, CTSC, DPP4, FAM26E, FETUB, GGH, HS3ST1, LRRC31, NTRK1, NABP1, PCSK6, POSTN, SERPINB4, SH2D1B, SIDT1, SLC26A4, SLC39A8, SLC5A1, SOCS1, SUSD2, USP54	ADEPT cohort

HS: Human sample, IVV: In vitro sample; MM: Murine model

Table E8: All predefined gene sets entered into gene set variation analysis		
#	**Gene Set**	**Source**
1	LDLRAP1, ASPM, BCL11B, MIS18A, CAMK4, CCNA2, CCNB1, CCNB2, CD3D, CD3E, CD3G, CD5, CD6, CD8A, CD8BP, CD8B, CDK1, CPOX, CTLA4, CXCR6, DGKA, DNAJB1, DUSP2, EGLN3, PRR11, GPR15, GZMK, H2AFX, HDGFRP3, PIK3IP1, HMMR, ICOS, IL22, IL9, INPP4B, KIF14, LAG3, LEF1, LEPROTL1, LRRN3, MELK, TAF1D, MKI67, PAICS, PRC1, ATAD2, DUSP4, RRM1, DEPDC1, AURKA, TCF7, TRAC, TOP2A, TPX2, TRAT1, UBE2C, UBE2S, ZBED2, ZWINT, HAUS1, NUF2, CDCA2, CDCA5, DHX33, STAMBPL1, MTFR2, TRDV3, AC017002.1, GPATCH4, MTHFD1L, UBE2T, IL17F, OXNAD1, ZBED6CL, NDFIP2, NDNL2, TRAV12-1, TRIM59, ZNRF1	http://www.ncbi.nlm.nih.gov/pubmed/15789058
2	AMPD1, PPOX, BANK1, BCL11A, TNFRSF17, BLK, BLNK, BMP8B, STAP1, VCPKMT, C19orf10, EDEM2, CD19, MS4A1, CD79A, CD79B, KLF6, DDOST, EAF2, EIF2AK3, ELL2, PDIA4, FCRL2, FKBP11, FAM46C, TXNDC15, TMEM156, GNG7, GPRC5D, WHSC1L1, SPCS2, SEL1L3, LZTFL1, MAN1A1, MANEA, NXPE3, NGLY1, OSBPL10, MZB1, PAX5, SUB1, PNOC, POU2AF1, QRSL1, RPN1, SEC24A, KDM5D, SPATS2, SPIB, SSR1, HSPA13, TCF3, TCL1A, SEC62, HSP90B1, TRAM1, TRAM2, UBE2G1, UBE2J1, EZR, VPREB3, FAM129C, PRDM15, CPNE5, LINC00926, ERN1, FBXO18, FCRL1, EME1, DERL3, FCRLA, PPAPDC1B, FCRL5, KLHL14, TXNDC11, NLRP7, RALGPS2, TLR10, WNT10A	http://www.ncbi.nlm.nih.gov/pubmed/15789058
3	ATP13A3, AP1S2, BHLHE41, CASP1, CCL24, CCRL2, CD1D, CDK5RAP2, CLEC5A, VCAN, CTSD, CTSL, CXCL1, CXCL3, CXCL5, CYBB, DFNA5, HBEGF, DUSP6, EREG, THBS1, PID1, GNA15, HS3ST3B1, IER3, IL19, IL1A, IL1B, IL36G, IL1RN, IL24, IL3RA, IL6, MTF1, MMP1, MMP14, MMP19, MMP9, NPC1, NRIP3, PFKFB3, PLAUR, PLD3, PPBP, PPIF, PTX3, RNU2-1, PHACTR1, SERPINB2, SERPINB7, SLC28A3, SLC31A1, SLC3A2, SRC, TCIRG1, TFPI2, NEAT1, TNFSF15, ZFYVE16, POMZP3, LINC00158, LINC00936, RP11-384O8.1, GJB2, GPR84, PNPLA8, IRAK2, DNAJC5B, MPEG1, MS4A6A, GLIS3, PLD1, PRAM1, SGPP2, SNX9	http://www.ncbi.nlm.nih.gov/pubmed/15789058

4	CD244, CHST12, CLIC3, IVNS1ABP, IVNS1ABP, KIR3DL2, KIR3DL1, KIR2DL2, KIR2DL4, KIR2DS4, KIR2DS5, KIR2DS5, KIR3DS1, KLRF1, NS1-BP, PTGDR, TGFBR1, YPEL1	http://www.ncbi.nlm.nih.gov/pubmed/15789058
5	ABTB2, ADAM12, ALOX15, CBR3, CCL13, CCL17, CD1A, CD1B, CD1E, CD86, N4BP2L1, CHST7, CLEC10A, CLIC2, CRLF2, CXCL11, EHD4, TRAFD1, FSCN1, IFI6, GRSF1, H6PD, HLA-DQA1, HLA-DQB1, HMG20B, HMOX1, IFIT1, CD209, CERS6, IFIH1, POGLUT1, MFSD12, MMP12, MX1, NAGPA, NR4A3, OAS1, SLCO5A1, PDCD1LG2, RAB30, RAB9A, RASSF4, ARHGAP22, SLC27A3, SIGLEC1, SPRED2, TBC1D13, UBD, CNOT10, TIFAB, MAP3K13, WFDC21P, NAA25, GPR157, L3MBTL4, KDM2B, SRGAP2, NFXL1, ZNFX1, C17orf58, NEURL3, MOB1B, NT5C3AP1, AKT1S1, NUB1, BLOC1S6, PVRL2, TTYH2	http://www.ncbi.nlm.nih.gov/pubmed/15789058
6	ABTB1, AMPD2, FAM53C, CCR3, CDA, CMTM2, CLC, CREB5, CTBS, CTBS, DICER1, MSL1, FCGR2B, FCGR3B, FCGR3B, MANSC1, FPR2, FRAT2, GPR27, FFAR2, HSPA6, CXCR1, CXCR2, TMCC1, SLC45A4, KRT23, MBOAT7, TSEN34, MXD1, YPEL3, CEP19, R3HDM4, MPPE1, SLC25A37, NCF4, NRBF2, PHC2, PROK2, RALB, RNF141, SEC14L1, MSRB1, STX3, TSPAN16, VMP1, VNN2, XPO6	http://www.ncbi.nlm.nih.gov/pubmed/15789058
7	FCGR2A, FCGR2C, CXCR1, CXCR2, FPR1, MME	http://www.ncbi.nlm.nih.gov/pubmed/27677865
8	CCL26, LOXL4, NOS2, CD36, CDH13, JAM2, HIGD1B, CLCA1, FZD5, CST2, IGHE, ATP5J, ALOX15, FETUB, AADAC, TOX2, LYPD1, CYYR1, HS3ST4, CST1, KRT31, IL1R2, NKX1-2, TUBAL3, PRKD1	http://www.ncbi.nlm.nih.gov/pubmed/21819959
9	CLCA1, POSTN, PRR4, SERPINB2, CPA3, TPSB2, TPSAB1, C16orf54, STOM, ZMAT2, AHDC1, EVC2	http://www.ncbi.nlm.nih.gov/pubmed/17898169
10	GPR115, DMXL2, STEAP4, MUC5B, SCNN1G, TMEM45A, SCGB3A1	http://www.ncbi.nlm.nih.gov/pubmed/17898169
11	FKBP5, GAS1, PHACTR3, FAM107A, HIF3A, TSC22D3, KLF9, HCAR3, PER1, C6, SORD, LINC00964, FXYD1, AHNAK2, WIPI1, CST1, CLCA1	http://www.ncbi.nlm.nih.gov/pubmed/17898169

12	TFCP2L1, HBB, MUC13, POSTN, SERPINB2	http://www.ncbi.nlm.nih.gov/pubmed/17898169
13	CCL26, PTCHD4, CLCA1, CST1, TUBAL3, CST2, CDH13, JAM2, NOS2, NTRK1, TMEM132B, PTGDR2, ZNF436, IL1R2, IGHE, FETUB, HIGD1B, TOX2, GRM8, NAGS, KRT31, KRT34, ATP5J, FZD5, LOXL4, NKX1-2, AADAC, DOK1, HRH1, CYYR1, CTDSPL, NOVA2, WWC2-AS2, PRKD1, CEP72, SLCO2A1, CD36, DISP1, LYPD1, ADM5, ALOX15, FAM124B	http://www.ncbi.nlm.nih.gov/pubmed/21187436
14	IRS2, CXCL6, FOLR1, DUSP1, DUSP4, MUC5B, SAA4, GLRB, HS3ST4, PROS1, TMEM45A, NR1I2, CSF3, AKR1C1, ACHE, CLGN, GUSBP4, GJB7, HGD, PIP5K1B, NA, SLC13A3, ZNF331, PGLYRP4, C11orf63, KIAA0232, PTP4A1, NSUN7, TSPAN6, HNF1A-AS1, RHOV, LRRC37B, PCYT2, LRWD1, ODC1, GK5, OSBPL6, ACTA1, CES4A, TCTN1, CCDC30	http://www.ncbi.nlm.nih.gov/pubmed/21187436
15	HBG1, CAMKK2, CAV1, DUSP1, DUSP5, FLNC, TNFRSF17, ALPL, TRIB1, SGK1, MME, SOCS3, PTGS2, IL1RAP, IL1R2, LIFR, COL18A1, ITGB8, GPC1, SLIT1, POMZP3, KCNJ4, SELL, PABPC4, TRIM9, PDLIM4, IGKC, IGH, GYPC, CDKN2C, CCL11, CABP1, RAMP3, RRM2, RBFOX2, CXCL8, MMP9, CXCL2, CD38, FPR1, TOP2A, AKAP8L, TRIP6, BCL3, RB1, CDC45, CREBBP, EGR1, TFDP1, ADCY3, SAT1, CCL3, FOS, MXD1, NA	http://www.ncbi.nlm.nih.gov/pubmed/23190644
16	NCK1, FASLG, ABI1, PSTPIP1, ARNTL, CLTC, RPS6KB1, FEZ1, CD247, GNAI1, HLA-F, HLA-B, KLRD1, KLRC1, KLRC1, EIF3C, EIF3A, HTRA2, ITGAL, SMAD7, CUL4A, SF3B3, MLH1, CDC7, SNUPN, HNRNPAB, SYT11, PRF1, MAS1, IFNG, NUP210, CDK13, SLC4A4, KIAA1279, VPS4B, XCL1, C14orf1, NFE2L1, CTCF, BRD8, RAB9A, ID3, PRSS23, PSMA3, GZMA, TAF1A, ATF2, STAT4, CEBPG,	http://www.ncbi.nlm.nih.gov/pubmed/23190644
17	COPB2, S1PR4, GNB1, ARHGEF2, CAMKK2, RABAC1, KIF3B, MKNK1, FLOT2, GRAP, MINK1, MAP3K14, MAP2K4, FMNL1, PGAM1, GLS, MTOR, NEDD4L, PTPN6, CSK, STAT5B, PIK3CD, HCLS1, RPA1, PRDX1, RPA2, HADHB, PRDX4, FZD7, LIMK2, AP3D1, VAMP2, VAPB, CFL1, WIPF1, DDB1, STX12, GPSM3, S100A9, IFNGR2, DLGAP5, ARF3, TPD52L2, PHC2, MAP4K4, GPI, AIMP2, ENO1, AKAP8L, RXRA, MBD2, ACVR1, SPEN, ICAM3, TRIP12, S100A8, RBPJ, PPP4R1, TM9SF2, BAG1, USP4, MTA1, SMAD4, NUP98, MAML1, ANP32A, ARFIP2, PCMT1,	http://www.ncbi.nlm.nih.gov/pubmed/23190644

	RAC2, ALDOA, NFYC, TP53TG1, DNPEP, MAPK14	
18	CYCS, CALD1, SLC25A4, PNO1, METAP2, FASLG, PKN2, AKT2, FGF2, RNF216, SSX2IP, RHEB, PIK3R1, GNAI1, TFRC, SH2B3, NCR1, HSPA5, LIPC, GUCY1A2, DLG2, SMAD7, ARF6, IFNG, SLC4A4, TIMM17A, YES1, JUND, MED1, GTF2B, ARID4A, RORA, CDKN1B, ENC1, ID2, MATK, ID3, ID1, KRR1, TNPO1, ANXA1, SKI, SRSF7, CHD1, SRSF3, MXD4, HIST1H1B	http://www.ncbi.nlm.nih.gov/pubmed/23190644
19	GNA12, MINK1, MAP3K14, RIPK1, GRB14, BCL10, SNTA1, HMOX1, SDC4, NEDD4L, PRG2, TGFBR2, CD5, PTGS2, LIFR, TLR6, IGF2, FURIN, ITGB8, CCL7, SORT1, LCT, FZD7, PABPC4, BMP6, GYPC, CDKN2C, CXCL9, CXCR3, MCM6, Mar-02, RAMP3, DLGAP5, RBFOX2, REPS2, CXCL3, CXCL2, HAPLN1, LCN2, CTSL, GEMIN4, TRIP6, BMP2, TRIP12, PHLDA1, TAB2, HMGA1, MSC, NUP98, EGR1, ADCY3, PRDM1, DNPEP, MAX, CCL3, ZFP36L1,	http://www.ncbi.nlm.nih.gov/pubmed/23190644
20	CYCS, SOS1, PSTPIP1, CRELD1, TARS, SSX2IP, ACD, P2RX7, MAP2K5, SYK, BLNK, PLCG2, HLA-B, NCR1, SEBOX, ATP2B4, IL2RG, ZRSR2, ARF6, TESK1, SF3B3, FANCA, VPS4B, ITGB1BP1, ITGA4, IRF8, NFE2L1, IRF1, HDAC3, STX8, MNAT1, GTF2H4, ANXA1, ARFRP1, HIST1H1B	http://www.ncbi.nlm.nih.gov/pubmed/23190644
21	YWHAE, SNCA, GPRIN2, APLP2, GRK5, CNN1, GNA12, KLK6, COPB2, CYB5R3, HBG1, NRGN, RGS2, S1PR4, GNAQ, TBXA2R, TOR1A, TUBA1A, GNB1, ARHGEF2, CTNNAL1, ADRBK2, GNG10, BDKRB2, SFN, NTRK2, MAPK3, CAV1, RIN2, RABAC1, DUSP1, RAB4A, SYN1, NOS1AP, PAK2, MKNK1, NCK2, WASF1, DUSP5, NTRK3, TNFRSF1B, MINK1, BST1, SOD2, SNCG, LTA, DUSP6, BUB1B, LSM1, GRB14, MAP2K4, CLIC1, FLNC, TRAF3, PCBP1, CSF2RA, ALPL, LDHA, BCL10, EIF6, TRIB1, LSM5, TNIP1, ACTN1, PDLIM1, FBP1, ADORA2A, PICALM, POR, TOM1, SNTA1, PGAM1, HMOX1, SVIL, TGFB1I1, SGK1, RAP1A, PTPN12, TNFRSF10C, SDCBP, BRAF, SDC4, FKBP1A, NEDD4L, BSG, SLC16A3, PRG2, PSEN1, PDLIM7, GAB2, ADM, MME, CSK, TLR2, PIK3CB, CSF2RB, LILRB2, FCAR, FCGR1A, CSF3R, SOCS3, STAT5B, FCER1G, WASF3, NDN, PTGS2, PECAM1, GAST, IL1RAP, MYD88, SLA, IL1R2, SSTR2, NUCB1, LILRB1, LY96, FCGR2A, GABARAP, TLR6, CD14, HCLS1, IGF2, NOV, GSN, LRP1, LRPAP1, APP, CR1, C4A, DMC1, RPA1, FURIN, GAPDH, TG, NOTCH2, ITGB8, HADHB,	http://www.ncbi.nlm.nih.gov/pubmed/23190644

	MMP14, TIMP2, CASP4, PGK1, CST3, BGN, CCL7, C4A, GPC4, CTSD, DSG3, SERPINA3, CHM, SORT1, NUMB, ITGB5, ADAM9, FLOT1, PRDX4, F5, LCT, RAB11A, GPC1, SLIT1, ITM2B, POMZP3, F8, C3AR1, ANXA5, PSAP, ICAM1, KCNJ4, LIN7A, CHP1, KIF1B, KCNJ2, S100P, SDC2, CAPNS1, LIMK2, ACTC1, ABLIM3, AP3D1, VAPB, VASP, STXBP2, DMTN, PIP5K1C, SSH1, CDC42BPA, LASP1, XPO6, VAMP7, ZYX, SRSF9, WIPF1, WDR1, TRIM9, TESK2, HIST1H2BD, PDLIM4, SF3B4, BMP6, UBOX5, EXO1, FCGR3A, TLR1, NAPA, STX12, MPP1, CDKN2A, UBE2C, ENSA, SMARCD3, CXCL9, CCL11, MCM6, STX6, Mar-02, BID, CD101, CD80, CD86, TYR, TYRP1, PITPNA, F2RL1, ST14, IL1RN, ABI2, ACVR2B, PDHA2, TPM4, GPSM3, ADRA2A, CABP1, CHST15, RRAGD, RAMP3, LAMP2, CTSA, IRAK3, IFNGR2, CP, DLGAP5, GYPA, RHAG, ARF3, CENPB, RNASE2, APOBEC1, RBFOX2, CA4, GP1BA, CDC42EP2, REPS2, ANXA3, TPD52L2, PLP2, HP, CD163, DPEP1, CHMP1A, C2, AQP1, PHC2, AFG3L2, S100A2, TPM1, ITGB1, MAP4K4, CXCL3, CXCR2, AMFR, GPI, COL4A4, TGFBI, CD36, CD93, CXCL8, CXCR1, MMP9, TIMP1, CXCL2, AIMP2, HAPLN1, CXCL1, CCL2, VCAN, CD63, EPS8, CD9, LCN2, COL1A1, SAA1, TLN1, ENO1, FPR1, UBE2E3, IRF2, GATA2, AKAP8L, MAPK7, THRB, CRMP1, CTSL, SPRY2, BCL6, RXRA, BMP7, PLSCR1, CUX1, NCOR2, TRIP6, ARNT, SERPINB3, MBD2, ACVR1, BMP2, SPEN, TRIP12, PHLDA1, SLPI, ANXA11, S100A8, RBPJ, FHL2, PPP4R1, KLHL35, RNF11, TAB2, CDK14, TM9SF2, RB1, RNF40, CREG1, BAG1, HMGA1, FRK, POU3F1, CAT, LILRA3, RBPMS, ZDHHC3, PRUNE2, MVK, CALM1, KCNMB1, SALL2, TPGS2, TFE3, ALDH2, NUP214, MAML1, ANP32A, H3F3A, TGM2, SMAD2, FTL, HIST2H2BE, MCF2L, RHOG, EGR1, HIST1H4A, S100A11, PCMT1, ZEB2, ALDOA, SPR, TFDP1, PRDM1, HDGF, NFYC, RAB13, AGT, SAT1, GBP2, TP53TG1, B4GALT3, NFATC4, ELK3, MAPK14, MAPKAPK3, ELK1, MAPK11, MAX, CEBPB, RBM42, MAPK10, KCNK1, CCR4, TRIM29, HOMER3, FOS, CCR1, SPAG9, USF2, MXD1, CASP5, ZBED1, CDC25C	

22	CALM1, SIAH1, PIK3CA, AKAP13, TTN, MRAS, FDX1, SLC25A4, PNO1, NCK1, METAP2, BIN1, CYFIP2, ABI1, AKAP1, EIF4A2, EIF4G2, EXOSC8, FBL, HSP90AB1, RPS6, TNFRSF10B, CDC37, HSP90AA1, HNRNPD, CAPN3, CHUK, AKT2, HARS, RPL5, RPSA, AIP, DDX39A, EXOSC9, CRELD1, OFD1, RPL6, ARNTL, SNRPN, RPL4, XRCC6, GSE1, UTRN, ACD, NCALD, RHEB, SOX4, RPS6KB1, RASGRP2, YWHAQ, MAGOH, KIF5B, TRAF4, P2RX7, PRKCZ, MAP2K5, FEZ1, DAPK3, YME1L1, CD247, PIK3R1, HNRNPU, BLNK, HLA-F, TRAC, CD72, FOLR1, IL6ST, KLRD1, INPP4A, KLRC1, SH2B3, NPM1, KLRB1, NCR1, EIF3G, EIF3H, EIF3E, EIF1AX, EIF3A, EIF3K, EIF5B, HSPA5, RECQL, XPA, RABGGTB, LRP8, PTP4A2, HMOX2, ITGAL, DLG1, EZR, ATP2B4, IL2RG, PIAS4, PRPF40A, RIF1, CLK1, SRSF6, U2AF2, ZRSR2, PPIG, SYNE1, SNRPD2, DYNC1LI2, NOL3, VAMP1, TRA2B, TWF1, SKP2, CUL4A, BRAP, CAND1, ZMYND11, BMPR1A, SF3B2, SF3B3, SF3B1, MLH1, SNRNP200, NONO, SFPQ, HSPA9, MVD, MPHOSPH10, IMP4, CD40LG, ZNF337, ATP5C1, ORC4, PSMC3, CDC7, ENO2, SNUPN, RPL17, SYNCRIP, SYT11, CSE1L, KPNA6, DPP4, STX16, GZMB, PRF1, SRSF5, SRRM1, IL12RB2, PI4KA, FBLN5, MAS1, PDHB, KPNA5, RPS19, ITPR3, ACIN1, AKR1C3, SRSF10, TRA2A, RRM1, AK1, CD48, IFNG, PARP2, NUP210, ABCE1, CELF2, CDK13, SLC4A4, OSGEP, 39326, TIMM17A, TIMM44, KIF22, REPS1, EMG1, SMARCC2, SMARCE1, TPD52, CCT4, RPL14, RPL7, TNNT2, ITGB1BP1, YES1, IGFBP3, EEF1B2, KARS, ITGA4, RPL10, XCL1, DFFB, NACA, TBP, C14orf1, ZNF24, ZBTB16, IRF8, COPS2, LAMTOR5, JUND, HMGB1, MED1, GTF2B, DHX9, ILF3, CTCF, TAF5, DPM1, POLR3F, PSMC2, STX8, SEPHS1, TRRAP, NDUFV2, KLF6, ARID4A, BRD8, HNRNPH3, CBFA2T2, RAB9A, EEF1D, DLST, DLG5, GATA3, CIR1, ILF2, SRRT, PMAIP1, RORA, ATM, TMPO, REL, PURA, CDKN1B, CCNE1, POLA1, DDX18, RAD17, GTF2H4, ELF1, CCNT2, NKRF, ENC1, MDM4, HBP1, CCND2, THOC1, PRDM2, AKAP8, TCOF1, UBTF, ERCC5, NOP56, RBBP5, PHB, EEF1E1, EWSR1, TRIM37, ID2, TCF4, MATK, ID3, ID1, PRSS23, RPS15A, ZMIZ2, KRR1, DDX5, PSMA3, GZMA, SET, NUP88, TNPO1, HSPD1, MAP3K12, RAN, ARF1, ANXA1, AES, PTMA, CAMK2G, MCF2, NXF1, MED6, SS18L1, E2F5, SRSF7, HIRIP3, TLE2, PPP2R1B, SMARCA5, TAF1A, RAE1, RPS7, HMGN1, ATF2, HNRNPK, MAPKAPK5, RAD52, UBE2I, CHD1, SRSF3, MKNK2, NOLC1, RPS6KA5, AIMP1, HOMER1, MXD4, STAT4, HSF2, CEBPG, MATR3	http://www.ncbi.nlm.nih.gov/pubmed/23190644

23	YWHAE, SNCA, GPRIN2, APLP2, GRK5, CNN1, GNA12, KLK6, CYB5R3, NRGN, GNAQ, TBXA2R, TOR1A, TUBA1A, GNB1, CTNNAL1, ADRBK2, GNG10, BDKRB2, SFN, NTRK2, MAPK3, RIN2, RABAC1, DUSP1, RAB4A, SYN1, NOS1AP, PAK2, MKNK1, NCK2, WASF1, FLOT2, NTRK3, TNFRSF1B, MINK1, BST1, SOD2, SNCG, LTA, DUSP6, BUB1B, LSM1, GRB14, MAP2K4, CLIC1, TNFRSF17, TRAF3, PCBP1, CSF2RA, ALPL, LDHA, EIF6, TRIB1, LSM5, TNIP1, ACTN1, PDLIM1, FBP1, ADORA2A, PICALM, POR, FMNL1, TOM1, PGAM1, HMOX1, SVIL, TGFB1I1, SGK1, RAP1A, PTPN12, TNFRSF10C, SDCBP, BRAF, SDC4, FKBP1A, MTOR, NEDD4L, BSG, SLC16A3, PDLIM7, GAB2, ADM, MME, CD5, TLR2, PIK3CB, CSF2RB, LILRB2, FCAR, FCGR1A, CSF3R, SOCS3, FCER1G, WASF3, NDN, PTGS2, PECAM1, GAST, IL1RAP, MYD88, IL1R2, SSTR2, NUCB1, LILRB1, LY96, FCGR2A, GABARAP, TLR6, CD14, HCLS1, IGF2, NOV, GSN, LRP1, LRPAP1, APP, CR1, C4A, DMC1, FURIN, GAPDH, PRDX1, TG, NOTCH2, ITGB8, MMP14, TIMP2, CASP4, PGK1, CST3, BGN, CCL7, GPC4, CTSD, DSG3, SERPINA3, SORT1, NUMB, ITGB5, ADAM9, PRDX4, F5, RAB11A, ITM2B, F8, C3AR1, ANXA5, PSAP, ICAM1, LIN7A, CHP1, KIF1B, KCNJ2, S100P, SDC2, CAPNS1, SELL, LIMK2, ACTC1, ABLIM3, VAMP2, VASP, STXBP2, DMTN, PIP5K1C, SSH1, CDC42BPA, LASP1, XPO6, VAMP7, ZYX, SRSF9, WIPF1, WDR1, TESK2, HIST1H2BD, SF3B4, BMP6, UBOX5, EXO1, IGK, FCGR3A, IGH, TLR1, NAPA, MPP1, CDKN2A, UBE2C, ENSA, SMARCD3, CXCL9, MCM6, STX6, Mar-02, BID, CD101, CD80, CD86, TYRP1, PITPNA, IL1RN, ABI2, ACVR2B, PDHA2, TPM4, GPSM3, ADRA2A, RRAGD, RAMP3, S100A9, LAMP2, CTSA, IRAK3, RRM2, IFNGR2, CP, DLGAP5, GYPA, RHAG, ARF3, CENPB, RNASE2, APOBEC1, CA4, GP1BA, CDC42EP2, REPS2, ANXA3, TPD52L2, PLP2, HP, CD163, DPEP1, CHMP1A, C2, AQP1, PHC2, AFG3L2, S100A2, TPM1, ITGB1, CXCR2, AMFR, GPI, TGFBI, CD36, CD93, CXCL8, CXCR1, MMP9, TIMP1, CXCL2, CXCL1, VCAN, CD63, EPS8, CD9, LCN2, COL1A1, CD38, SAA1, TLN1, ENO1, FPR1, UBE2E3, TOP2A, IRF2, GATA2, AKAP8L, MAPK7, THRB, CRMP1, CTSL, SPRY2, BCL6, RXRA, BMP7, PLSCR1, CUX1, NCOR2, ARNT, SERPINB3, MBD2, ACVR1, PHLDA1, BCL3, SLPI, ANXA11, S100A8, FHL2, PPP4R1, KLHL35, RNF11, TM9SF2, RNF40, CREG1, HMGA1, FRK, CDC45, MTA1, POU3F1, CAT, MSC, LILRA3, RBPMS, ZDHHC3, PRUNE2, MVK, CALM1, KCNMB1, SALL2, TPGS2, CREBBP, SMAD4, TFE3, ALDH2, NUP214, MAML1, ANP32A, H3F3A, TGM2, SMAD2, FTL, HIST2H2BE, MCF2L, RHOG, EGR1, HIST1H4A, S100A11, ZEB2, ALDOA, SPR,	http://www.ncbi.nlm.nih.gov/pubmed/23190644

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24	CALM1, PIK3CA, PRKCE, AKAP13, TTN, MRAS, CALD1, FDX1, NCK1, SOS1, METAP2, BIN1, CYFIP2, PKN2, AKAP1, EIF4A2, EXOSC8, FBL, HSP90AB1, RPS6, TNFRSF10B, CDC37, HSP90AA1, CAPN3, CHUK, AKT2, HARS, RPL5, RPSA, MAP2K7, AIP, FGF2, DDX39A, EXOSC9, OFD1, RPL6, TARS, SNRPN, RNF216, RPL4, CLTC, XRCC6, UTRN, ACD, NCALD, SOX4, RPS6KB1, RASGRP2, MAGOH, KIF5B, TRAF4, P2RX7, PRKCZ, DAPK3, YME1L1, CD247, HNRNPU, BLNK, HLA-F, TRAC, CD72, FOLR1, PLCG2, IL6ST, KLRD1, INPP4A, TFRC, KLRC1, SH2B3, NPM1, KLRB1, EIF3G, EIF3H, EIF3J, EIF3E, EIF1AX, EIF3K, EIF5B, RECQL, HTRA2, RABGGTB, LIPC, LRP8, PSEN2, HMOX2, DLG1, EZR, MYO6, PIAS4, PRPF40A, RIF1, CLK1, SRSF6, U2AF2, ZRSR2, PPIG, SYNE1, SNRPD2, DYNC1LI2, NOL3, VAMP1, TESK1, SKP2, BRAP, CAND1, ZMYND11, BMPR1A, SF3B2, SF3B1, SNRNP200, NONO, SFPQ, HSPA9, MVD, MPHOSPH10, IMP4, CD40LG, ZNF337, ORC4, PSMC3, ENO2, SNUPN, RPL17, SYNCRIP, HNRNPAB, CSE1L, KPNA6, DPP4, PSMA1, STX16, GZMB, SRSF5, PI4KA, FBLN5, PDHB, KPNA5, RPS19, ITPR3, ACIN1, AKR1C3, SRSF10, TRA2A, AK1, CD48, PARP2, NUP210, ABCE1, CELF2, OSGEP, 39326, TIMM44, KIF22, REPS1, EMG1, SMARCC2, TPD52, KIAA1279, CCT4, RPL14, RPL7, TNNT2, IGFBP3, EEF1B2, KARS, RPL10, XCL1, DFFB, TBP, ZNF24, ZBTB16, IRF8, COPS2, LAMTOR5, HMGB1, IRF1, HDAC3, MED1, GTF2B, DHX9, ILF3, TAF5, DPM1, POLR3F, PSMC2, SEPHS1, TRRAP, RPS27A, NDUFV2, KLF6, ARID4A, BRD8, HNRNPH3, CBFA2T2, EEF1D, DLST, DLG5, GATA3, CIR1, ILF2, SRRT, PMAIP1, ATM, TMPO, REL, PURA, MNAT1, POLA1, DDX18, RAD17, GTF2H4, ELF1, CCNT2, NKRF, MDM4, HBP1, CCND2, THOC1, PRDM2, AKAP8, TCOF1, UBTF, ERCC5, NOP56, RBBP5, PHB, EEF1E1, EWSR1, TRIM37, ID2, TCF4, MATK, TCF12, RPS15A, ZMIZ2, KRR1, DDX5, PSMA3, SET, NUP88, TNPO1, HSPD1, MAP3K12, RAN, ARF1, ARFRP1, AES, PTMA, CAMK2G, NXF1, MED6, SS18L1, E2F5, SRSF7, HIRIP3, DDX19A, PPP2R1B, SMARCA5, TAF1A, RAE1, RPS7, HMGN1, HNRNPK, RAD52, SRSF3, MKNK2, NOLC1, RPS6KA5, AIMP1, HOMER1, MXD4,	http://www.ncbi.nlm.nih.gov/pubmed/23190644

	STAT4, HSF2, CEBPG, MATR3,	
25	RGS2, S1PR4, RABAC1, DUSP1, KIF3B, FLOT2, GRAP, SOD2, DUSP6, RIPK1, TNFRSF17, TRAF3, ALPL, TRIB1, ADORA2A, GLS, SVIL, SGK1, TNFRSF10C, SLC16A3, PRG2, PSEN1, TGFBR2, MME, PTPN6, FCAR, CSF3R, SOCS3, STAT5B, PTGS2, PIK3CD, SLA, IL1R2, TLR6, CD14, HCLS1, NOV, RPA2, COL18A1, CHM, FLOT1, C3AR1, S100P, SELL, LIMK2, CFL1, XPO6, DDB1, IGK, IGH, TLR1, CXCR3, STX6, CD80, TYR, F2RL1, ST14, CHST15, IFNGR2, PLP2, PHC2, CXCL3, CXCR2, COL4A4, CXCL8, CXCR1, MMP9, CXCL2, CXCL1, CCL2, FPR1, IRF2, BCL6, GEMIN4, ARNT, ICAM3, SLPI, S100A8, CDK14, USP4, NUP214, ARFIP2, EGR1, S100A11, RAC2, PRDM1, B4GALT3, CCL3, CCR4, FOS, CCR1, MXD1	http://www.ncbi.nlm.nih.gov/pubmed/23190644

26	SIAH1, PRKCE, EIF4G2, HNRNPD, MAP2K7, OFD1, RPL4, SSX2IP, XRCC6, GSE1, YWHAQ, P2RX7, YME1L1, SYK, KLRD1, KLRB1, EIF3H, EIF3J, EIF3E, EIF3C, EIF3K, SEBOX, XPA, LRP8, PSEN2, PTP4A2, GUCY1A2, DLG2, MYO6, SYNE1, DYNC1LI2, NOL3, TRA2B, TWF1, CUL4A, ATP5C1, RPL17, FANCA, PSMA1, GZMB, SRRM1, IL12RB2, ITPR3, AKR1C3, SRSF10, TRA2A, RRM1, IFNG, 39326, REPS1, SMARCE1, TNNT2, KARS, NACA, ZBTB16, HMGB1, POLR3F, PSMC2, STX8, RPS27A, HNRNPH3, CBFA2T2, RAB9A, CIR1, CCNE1, MDM4, HBP1, TCF12, RPS15A, KRR1, TNPO1, SKI, MCF2, TLE2, DDX19A, RPS7, MAPKAPK5, UBE2I, HOMER1	http://www.ncbi.nlm.nih.gov/pubmed/23190644
27	BCL3, SOCS3, PIM1, SBNO2, LDHA, CMAHP, PDCD1, IGFL1, LOC731186, MUC1, GPRIN3	http://www.ncbi.nlm.nih.gov/pubmed/22532634
28	CFH, CFLAR, PLXND1, CYB561, TYMP, ANK1, RORA, TRIB2, TXK, PLD1, MCAM, IL12RB2, P2RX5, MAP3K4, ABCB1, TBC1D2, IL12RB1, TNFSF13B, CTSH, CA2, TRPS1, KCNN4, IMPDH1, SPOCK2, HLF, IL26, KLRB1, IL17A, IL17F, CCL20, ITGA4, IL1R1, EPAS1, ELOVL4, CCR2, APOL3, PALLD, ARNTL, SCRN1, FURIN, ITGAX, TOB1, RORC, SLC4A10, ADAM12, DST, GBP5, AUTS2, ACE, ZFYVE28, CCR5, IL23R, B3GALT2, ANTXR2, PTPN13, ANXA5, HPGD, CTSB, AQP3, KIF5C, LIMS1, CXCR6, DAB1, PTPRM, LONRF3, GREM2, FES, ZNRF1, GIMAP5, DPP4, LINGO4, TNFRSF25, LINC00299, LGALS3, ALPK1, PFKFB3, RNASET2, PDCD4, MAGED4, MAST4, ITGA6, CITED2, OSBP2, CERK, VDR, AK3, CDH4, S100A6, LRP12, MAPK10, RUNX1, MXD1, EMP1, SMOX, DTX1, AGPAT4, MYC, PCBP4, SPG20, PDE4D, NR1D2, NPDC1, CEBPD, ATP6V0A1, RCL1, LATS2, RAB11FIP5, RARG, GRAMD1B, SLC35G1, IL6R, GABBR1, ENTPD6, IL7R, SSBP3, GNA15, YBX3, TTC39C, FHL1, MLLT4, FLOT1, CCDC65, PERP, ADAM15, RPS6KA3, TGFBR2, STOM, NEO1, IL4I1, IL18RAP, TDRKH, AGO4, PHLDA1, PPP4R1, LIMS3, GAB3, CLIC3, ADTRP, EVA1C, SEC31B, ME1, FLT3LG, NMRK1, MVP, EPG5, MAN2A2, C3AR1, ZNF652, PLEKHF1, DSE, CD274, CASK, FKBP11, OBFC1, ELOVL6, PXK, PPP2R2B, GALNT10, CYP27B1, PPT1, MAPK3, METRNL, SETD7, THBS1, NR1D1, C14orf182, LTBP4, SLAMF1, SRD5A3, ADCY3, ACKR3, ABCD1, CLOCK, MCF2L2, JUN, RNF144B, SFXN3, VSIG1, AMPD2, IFI44, ZDHHC9, KCNA2, LMO4, ECE1, FEZ1, TMEM184B, NCF4, TRADD, UNC93B1, MB21D2, PPAP2C, LST1, MYO5A, C4orf26, CYFIP1, PLAUR, MAST1, METTL21B, NUAK2, FAM159A, CRYBG3, SH2B2, MDM2, CSNK1E, ADA, SLC38A5, CFHR1, MAML3,	http://www.ncbi.nlm.nih.gov/pubmed/22715389

	SOX5, SMAD3, RIPK2, NPHP4, GLA, MAP3K7CL, PAG1, CFP, LAPTM4B, PITPNC1, MPI, SFXN2, ZFP36L1, CDC42EP3, TSHZ3, ROPN1L, SIAE, NPC1, LPCAT4, MINA, NT5E, ARL3, TANC2, USP30, ITGA3, THOC3, B3GALNT2, MAP3K3, GIMAP1, BOP1, PGS1, C10orf2, DHX32, TNFRSF10B, TCEAL3, IRF1, KCNA3, PLSCR3, PLXNC1, ADPRH, PRKCD, ANKRD28, DHX58, NDRG1, EXT1, PHF11, CHN1, RANBP9, WDR59, RNF19A, CORO2A, CACNB3, OSTF1, MKNK2, ENPP2	

29	MCM8, CDKN2AIPNL, MMP25, CD74, CFLAR, FOXK1, CSNK1G2, ZNF250, DMC1, MAGT1, ZNF14, HLA-E, FAM115A, SSTR2, SPTLC1, NA, METTL21A, NLRP8, NCF1C, NA, ZFYVE20, ZNF321P, YRDC, ITGA2, NA, IL10, OCIAD1, STAT1, C5orf28, ALPP, RNF24, IL17RD, GABPB2, DDX51, C8orf37, KCNH6, ITPK1-AS1, GPR1, CASP4, NA, EID2B, ZNF682, TNFSF13B, HSD17B7, N4BP2, CDAN1, FKBP14, TUBA3FP, BLZF1, HYPK, SPI1, XPNPEP3, DTWD2, ADAR, SDHAP1, AK1, PDE4C, GJC1, FKTN, GGA1, RBCK1, ZNF549, SLC16A12, MCMDC2, DHFR, MBOAT7, INIP, MSRB3, SHISA5, MSH3, SLC35E1, MIF, ZNF430, MTMR12, CFAP74, NA, AUNIP, EIF2AK2, XRCC2, FAM73A, ZNF814, PNPT1, VCAN, VIM, ZNF69, RASGRP2, NUBPL, PARP14, SLC44A2, SORL1, AFF3, ZNF530, NA, ORC6, FBXO40, USP49, IFI35, AKNA, ZMAT3, NPIPB3, PPA2, FCGR1A, MLKL, ARL16, SLC44A4, GPSM3, LILRB1, PSME2, ZYX, TAPBP, PLIN3, NA, ARHGDIA, SEMA3E, CORO1A, CEP19, IRF9, ZNF652, SERPING1, MAP3K11, GNAI2, EXO5, SERPINA1, ACAP1, SLC25A44, CYB5RL, VHL, MVP, IL4R, PSMB8, ZNF394, TDP1, RHBDF2, LRRC47, ERAP2, IRF7, HLA-G, PARP10, ZNF683, TNFSF14, MBD4, AHR, CREB1, PLEKHO2, CATSPER2, ZNFX1, ZNF786, SNRNP70, RPL7L1, AKT1, LPAR2, SLC16A3, INTS7, CMTM7, ATHL1, PDCD7, SYAP1, CCR6, CTDSP1, TIAF1, MYO1F, C17orf62, LAP3, STAT5A, ADRM1, IL18, BCYRN1, KIAA0101, ARF3, FAM177A1, CSF2RA, CTSW, CAPZB, C15orf39, PDPR, PPP2R1A, TCIRG1, MAST3, SP110, AKR1D1, ISG15, IL17RA, UNC93B1, CFD, HNRNPU, JUP, NOP56, DAPP1, RN7SL1, ANKRD22, PTPN6, CD27, MBD6, TRPC4AP, CD97, MKNK2, MYO1G, TRANK1, ATG16L2, NDE1, LAPTM5, CPT2, AHCYL1, CD37, SLC25A28, PLCB2, NCOR2, MICAL1, ZNF483, NBEAL2, PIGR, GAPDH, ITIH5, PGS1, ACADVL, IRF2BPL, RBM23, TMEM17, RNF167, VPS9D1, MED22, SBNO2, PRKD2, LAT2, LILRB3, SDF2L1, CNDP2, GRIPAP1	http://www.ncbi.nlm.nih.gov/pubmed/21357945

30	GPR183, CD300LF, UBE2A, CRLF3, 37500, PRDX5, RSBN1, TPM1, C5orf15, DNAJB6, SMOX, ADSS, ZMAT2, HMBS, INSIG1, TRIM33, TMEM183B, H2AFY, CEPT1, DNAJA4, TOR1AIP1, ANP32B, SCAMP1, GPX4, RGS10, KIAA0430, KIAA1551, LBR, XPO7, CCNI, TM6SF1, HNRNPK, RPL6, SLC44A1, TLE4, SLC40A1, VEZF1, SRP14, MS4A7, PNRC2, EFR3A, ARRDC3, HPS1, CDKN1B, TMBIM4, SNX3, TMEM87A, OGT, BCL2L1, ATP6V0C, MBP, XK, CD47, ANXA5, TFDP1, PRDX6, NPRL3, SIAH1, CHMP3, FGL2, IGF2BP2, OPTN, BAZ2B, CD302, ARPC3, GLO1, SNRK, PRKRIR, UBE2D3, PGRMC1, ATP6V1A, PAPD4, PRNP, FAM60A, TMED5, EVI2B, PELI1, KLHDC8B, PRDX3, PTEN, DAZAP2, OR2W3, SUZ12, VMP1, EEF1A1, BPGM, LST1, GUCD1, JTB, UBXN4, NDUFB5, TNS1, F2RL1, SRP9, MAP3K7CL, YPEL5, OLR1, ACP1, FBXO33, FTL, YOD1, ETS1, ATP5L, Mar-08, MPP1, CMTM6, AP1S2, BTF3, PRDX2, C2orf88, SH3BGRL, DPM2, CAB39, GYPB, RIOK3, RAB10, GOLGA7, RAB31, ITGB1, CLK1, EEF1A1P12, EIF3E, YBX1, ACTR2, SLC6A10P, CCNDBP1, CXCR4, ATP5E, DCAF6, PTBP3, HAGH, TMSB4X, POLR1D, C9orf78, CD46, CHPT1, YWHAH, ATP5EP2, LYZ, PTGS2, YBX3, TMEM71, PIP4K2A, OXR1, GNG11, ARL6IP1, IFIT1B, CAPZA2, GRINA, RGCC, TMEM123, MMD, NPTN, TMOD1, SDPR, SGK1, IFNGR1, HIST1H2AC, RPL30, RNF11, SERF2, CXCL8, TRAM1, GYPC, PCNP, PRKAR1A, RAB11A, PAIP2, PSMF1, SESN3, ZFAND5, FBXO7, SRGN, CHURC1, FAM104A, UBXN6, GABARAPL2, Mar-07, TPGS2, PPM1A, HBA2, MS4A3, OAZ1, HBB, UBB, ASCC2, ADIPOR1, SELENBP1, NINJ2, VNN2, CA2, ODC1, TSPAN5, SLC25A39, E2F2, TPT1, TRIM58, DCAF12, NCOA4, MBNL3, CEACAM8, RAB2B, GSPT1, OLFM4, RAP1GAP, SNCA, EPB42, MKRN1, RGS18, GYPE, ELANE, SLC4A1, GLRX5, PITHD1, VWCE, BNIP3L, AHSP, STRADB, HBD, ALAS2, YBX3P1, CAMP, FAM46C, DEFA4, DEFA1B	http://www.ncbi.nlm.nih.gov/pubmed/21357945
31	BCL11A, CCR7, KIAA0125, RBP5, CD22, FAIM3, DHRS9, ATP2C2, FCRLA, KBTBD12, CES3, C8orf34, GPR110, CR2, C5orf20, LOC130576, ZFYVE19, IGDCC4, DERL3, OSBPL3, MZB1, UNQ6228, SIGLEC6, CXCL13, MAN1C1, UGT8, CD79A, DMRT2, TMEM200A, GPR110, LRRC75A, TMEM9, SLC4A8, CALB2, RALGPS2, FAM129C, FOLH1, KLHL6, PDGFRL, TMEM182, ANKS1B, PRDM15, PRRX1, SLC45A3, IRF4, PNMAL1, CD79B, AMPD1	http://www.ncbi.nlm.nih.gov/pubmed/23925644

32	PAPSS2, WFDC1, NOSTRIN, NDEL1, NEDD9, STARD13, ASRGL1, EDNRB, KLF13, STOM, GPR4, MT1JP, SYN2, TMEM2, STX12, COL4A2, PAG1, RTN4, ABTB2, FCN3, ACVRL1, NES, PLXNA2, PODXL, PECAM1, RGCC, S100A8, TACC1, ENG, TPST2, KRT7, SYCP2L, MYH9, CYP4Z1, PHLDB1, WNT2B, BTNL3, SMAD6, RCOR1, LUZP1, PRKCE, ARHGEF10, HPCAL1, QKI, HERC3, COL4A1, GABARAPL1, CTTNBP2NL, KL, RIC1, CELF2, FOXF1, TMBIM1, BRINP1, CSPG4, SH3BP5, STXBP6, ATOH8, TAL1, CRMP1, RAI2, S1PR1, LPHN2, MAP2, CMTM8, SDE2, VIPR1, PKN1, ECHDC3, ADRB1, GREB1L, GPR133, ZNF358, PTPN12, LRRC8A, MAOA, TGFBR2, EPAS1	http://www.ncbi.nlm.nih.gov/pubmed/23925644
33	FKBP5, PDK4, RHOBTB3, ART3, PPM1K, HIF3A, KLF9, SLC39A8, PDE4DIP, JADE1, KLF15, KCNAB1, PRPH, TMX4	http://www.ncbi.nlm.nih.gov/pubmed/23925644
34	TMPRSS11D, SERPINB13, SPINK5, KRT4, TMPRSS11A, CSTA, GABRP, TYMS, GPR87, TMPRSS4, ATP10B, CH25H, SRPX2, IGKC, BNIPL, RAB38, CAPNS2, FANCD2, ABCC1, TENM2, BNC1, KLK10, PTAFR, CRABP2, TENM4, TRIM16, EYA2, GNA15, SMAGP, BICD2, EXOSC7, SCO1, BID, RHNO1, ITPA, TSPAN17	http://www.ncbi.nlm.nih.gov/pubmed/23925644
35	PPP2R1B, SCUBE3, ADAM22, GCC2, ACTA2, KIAA0319, FAM129A, MYOCD, NTN1, SYNPO2, CCDC30	http://www.ncbi.nlm.nih.gov/pubmed/23491407
36	IFI35, IRF7, MX1, MX2, XIAP, IFI44L, OAS2, LY6E, AGRN, IFIT1, RSAD2, ISG15, IFIT3, CCL2, TDRD7, PLSCR1, ACSL1, TNFSF10, OAS1, GBP1, SERPING1, FCGR1A, C2, TYMP, STAT1, LAMP3, LGALS3BP, IFITM3, TAP1, IFI6, APOBEC3F, APOBEC3C, APOBEC3B, APOBEC3A, APOBEC3D, APOBEC3G, G6PD	http://www.ncbi.nlm.nih.gov/pubmed/12642603
37	CD3D, DLEU1, COX11, HNRNPDL, DAP3, SORL1, PRNP, SLC25A6, EIF4B, PABPC4, RAB4A, CD3G	http://www.ncbi.nlm.nih.gov/pubmed/12642603
38	CCL5, GZMA, GZMK, PDCD1, IFNG, PACSIN1, CLIC3, TIGIT, CD70, TBX21, LYAR, ST8SIA1, CFH, IRF5, CTSH, OSM, LMO4, CCR4	http://www.ncbi.nlm.nih.gov/pubmed/23870669

39	SEMA5A, LOC729041, GATA3-AS1, NEFL, GAB2, KLRB1, NRIP3, ZP1, METRNL, TPPP, CAPG, ITPRIPL1, GATA3, ZDHHC11B, TNFRSF18, CADM1, ZDHHC11, NOD2, FANK1, LOC100131176, ABCA2, SUSD4, BEGAIN, HOMER3, MRC2, ZBTB16, DUSP23, SNED1, C16orf45, BAI2, PPP1R9B, GALT, SNTN, ASPH, PRMT9, LMCD1, BEST4, RORC, NOS3, SLC25A33, PPAPDC1B, ARHGAP42, SEMA5A, LOC729041, GATA3-AS1, NEFL, GAB2, KLRB1, NRIP3, ZP1, METRNL, TPPP, CAPG, ITPRIPL1, GATA3, ZDHHC11B, TNFRSF18, CADM1, ZDHHC11, NOD2, FANK1, LOC100131176, ABCA2, SUSD4, BEGAIN, HOMER3, MRC2, ZBTB16, DUSP23, SNED1, C16orf45, BAI2, PPP1R9B, GALT, SNTN, ASPH, PRMT9, LMCD1, BEST4, RORC, NOS3, SLC25A33, PPAPDC1B, ARHGAP42,	http://www.ncbi.nlm.nih.gov/pubmed/23870669
40	BCL2L11, FLJ46446, NECAB3, TULP4, NXPE3, E2F3, TMEM2, CD27, LOC100128031, MBD5, GBP5, SLC12A6, PELI2, KBTBD11, CCR7, NRIP1, SNN, GPA33, PRAGMIN, TXK, ACTN1, IGF1R, BTBD11, ADTRP, TMIGD2,	http://www.ncbi.nlm.nih.gov/pubmed/23870669
41	KLRB1, RORC, PLXND1, CTSH, ALOX5, PTPN13, IL4I1, SMCO4, NEFL, HLF, JAKMIP2, DSE, LIMS1, HLA-DRB1, LTK, HLA-DRB4, USP10, NR1D1	http://www.ncbi.nlm.nih.gov/pubmed/23870669

42	MYO1F, MIAT, ADAM19, LINC00152, E2F2, FAM129A, RP3-527F8.2, TESC, PDCD1, ANXA2, PRDM1, FAM46C, HLA-DRB1, LOC541471, ITGB1, NPDC1, ANXA2P1, HLA-DRB4, LOC338620, NCF4, TNFRSF4, LGALS1, TIGIT, MPST, SAP30, OASL, CPNE7, CALHM2, CD70, SRXN1, PMAIP1, GPR68, C12orf75, PLA2G16, PTGER2, PTTG1, PERP, HNRNPLL, FAS, IER5, MAF, ACTN4, RPL39L, SYT11, ANXA4, CDKN2C, AHNAK, LRFN4, RP11-374F3.4, APOBEC3C, IRF5, CHST7, DNAI2, PREX1, RNF214, S100A11, ATXN1, TNFRSF1B, SMCO4, S100A4, TUBB4B, TP53INP1, CYSTM1, CCR10, ANXA5, LOC284475, NDC80, TBK1, CREM, GALM, NBEAL2, PPP1R15A, ODF3B, ZC3H12A, CLIC5, TST, CD82, PRDM8, IL10RA, DLG3, PIEZO1, AIM2, YWHAH, HN1, CAPG, CTSH, PHACTR2, CD58, ACOT9, AAED1, CD99, GGTLC1, CLDND1, ATP2B4, PDIA6, SLC35B2, PI16, NABP2, SAMSN1, MYO1G, CLIC1, EZR, SLAMF1, CHST11, FAM53B, OSBPL3, LMNA, RILPL2, RALGDS, ARPC1B, GLIPR1, TRIM59, CRIP1, GATA3, SRGAP2, IL32, CDKN2A, BTG3, CCDC167, RUNX2, SRGN, ANTXR2, NLRP3, ADAM8, TPM4, GLIPR2, TXN, SSBP4, NABP1, CD63, OPTN, ASNA1, MTHFD2, RGS2, SURF4, CREB3L2, CD84, IDS, ZFYVE28, FLNA, COTL1, RAB11FIP1, COMMD5, SQRDL, PDP1, PANX1, RNF135, AQP3, FAM45A, SMC4, BNIP1, HERPUD1, GLB1, CAPN1, SHKBP1, SLC9A9, HSPA1A, SCO2, GDE1, TUBB2A, RABGAP1L, EAF1, SLC25A24, PRKCD, TRIM47, CAPN2, CCR4, SLCO3A1, PFKP, S1PR2, REEP5, SNAI3, PMVK, S100A10, GGTLC2, CTSA, AHR	http://www.ncbi.nlm.nih.gov/pubmed/23870669
43	TPCN1, ZSCAN18, DBH-AS1, CDCA7L, ZNF204P, CITED4, TCTN1, NAA16, GHRLOS, MYH3, LRRC24, ACVR1C, hCG_1990547, SLC12A7, LOC100128670, MYL5, CAPN5, GPRASP1, LAMB2P1, SMIM1, PCED1B, PPP1R3E, TXK, ROBO3, NUCB2, MEIS3P1, TLE2, MPZL1, CHI3L2, IL6ST, ACSS2, MPP1, ZNF573, PPT2, CCR7, FAM117B, SNN, EPHX2, AMIGO1, PLAG1, NET1, CHKA, MAN1C1, FBP1, SATB1, MDS2, GSAP, LOC100132345, LOC100131662, NLGN2, ITGA6, TRABD2A, TSPAN3, SCARNA16, B4GALT4, ACTN1, CERS6, NUAK2, GPC2, FBXO15, FLJ41649, BCAS4, TNFRSF10D, PDE9A, GNG7, GSTM2, CCDC106, FAM153A, PRAGMIN, AK5, PTPRS, LOC650392, APBA2, SOX8, IGF1R, BACH2, EPHB4, MYO15B, RIN1, FAM153B, AEBP1, PCSK5, AIF1, FAM213A, FHIT, LOC100129534, COL18A1, TMIGD2, CELA1, HSPG2, CLEC11A, NOG, LRRN3,	http://www.ncbi.nlm.nih.gov/pubmed/23870669

44	TRIB1, FANK1, HLA-DRB1, HLA-DRB4, LOC541471, DUSP4, CD70, TIGIT, IL2RA, FOXP3, PMAIP1, CKS2, IKZF2, ICA1, SMPD3, CPNE2, RORC, PTPLA, BFSP2, MGST2, RPL39L, CTLA4, TNFRSF1B, NUSAP1, VAV3, DUSP10, SLC2A8, TOX, KLRB1, SPATS2L, CTNNAL1, LOC284475, F5, IKZF4, PCTP, BASP1, LMCD1, RHOXF1, SETD7, TRIM16L, SHMT2, CXCR5, RP3-527F8.2, HLA-DMB, GBP5, HLA-DOA, FLJ46446, SMC6, HLA-DMA, IRF4, LOC730631, HS3ST3B1	http://www.ncbi.nlm.nih.gov/pubmed/23870669
45	AP3M2, TSPAN18, ZFP36L2, GPR35, LOC100131646, DPP4, SOS2, NLRP3, ASPH, MSX2P1, WNT10B, TMEM71, IL7R, WNT7A, STAT4, NOSIP, NR3C2, NOG, PDIA5, RBMS1, RECK, ACSL6, LOC643988, APP, CD40LG, VIPR1, WNT7B, CACNA1I, THEMIS, ID2, C1orf228, SCML4, LOC100132345, SOX8, DENND5A, AXIN2, ANK3, LOC650392, SLC40A1, NELL2	http://www.ncbi.nlm.nih.gov/pubmed/23870669
46	ALOX5, ANXA4, BIVM, BPI, BRD7, CAMP, CASK, CD63, CEACAM6, CEACAM8, CFLAR, DEFA4, GCA, LCN2, LOC23117, LOC728358, LTF, MBOAT1, MMP8, MNDA, PDE4D, POLR2J2, PPP1R16B, PRKCB, RETN, RNASE3, RUNX2, S100A12, S100A8, S100A9, S100P, SLC38A2, SPATA13, SRGN, SRGN, STOM, TNIP1, TTYH2, UGCG, ZNF749	http://www.ncbi.nlm.nih.gov/pubmed/21917308
47	AGPS, AKIRIN1, ANAPC5, ANKRD12, ANKRD17, ANXA3, ARFGEF2, ARG1, ARIH1, AZU1, BAG2, BPI, CASD1, CASP2, CASP6, CD24, CEACAM1, CEACAM6, CEACAM6, CEACAM8, CFLAR, CHI3L1, CHI3L1, CPEB4, CSNK1A1, CYCS, DOCK9, EHBP1L1, ELANE, FAM20B, FAS, FLJ10038, FLJ38717, GCA, GGA1, GNAQ, HERPUD2, HP, HP1BP3, KDM4B, KLF9, LCN2, LOC23117, LOC728358, LRRC8C, LTF, MINA, KMT2A, MPO, MS4A3, MSI2, NBPF11, NIPSNAP1, NMT2, NUP160, OXR1, MTPAP, PGLYRP1, PLP2, PLRG1, POGK, POLR2J2, POLR2J2, PRKX, PTER, PTPLAD1, RBM6, RECQL, RNASE3, RNPC3, RPL37A, RPS10, RSL1D1, S100P, SAMHD1, 38961, SF1, SMARCC2, SNRPN, SPEN, SRP72, TAF15, TCN1, TMEM106B, TMEM63A, TMF1, TNRC6B, UBE2H, UGCG, UGCG, YTHDC2, ZFP90, ZNF131, ZNF195, ZNF749	http://www.ncbi.nlm.nih.gov/pubmed/21917308

48	ABCC3, ABCC8, ABLIM2, ACTL6B, ADAM19, ADAMTS7, ADO, ALPPL2, APOBEC3F, APOBEC3G, APOC3, APOE, AQP2, ARTN, ARTN, ASCL2, BIRC7, BOC, CD1C, CD74, CDKN1C, CHRNA2, CLDN9, CLEC10A, CLEC2L, CLEC7A, COL11A2, COX6A1, CSF1R, CSPG5, CST3, DKFZp761P0212, DNALI1, EIF3B, ENPP7, C2CD4B, FAM71A, FCER1G, FGD2, FGFR1, FGL2, FLJ20021, RTP5, GALNT9, GDF9, GNPTAB, GP1BB, GPR114, GPR20, GPR39, GPRC5B, HAB1, HBA1, HBA2, HBA2, hCG_2007354, HES4, HLA-DQB1, HMOX1, IFI30, IGHA1, IGHA1, IL18RAP, IRF8, NMRK2, KDM8, KCNC4, KIAA1598, KIAA1648, PLIN4, KIF26B, KLF4, KLK13, KLRB1, KRT8, LGALS1, LILRA4, LMNA, GPAT2, LOC283177, FBXL19-AS1, SSC5D, LOC284837, LOC349114, LPAR3, LRRC16B, LRRC25, LRRN4, LRTM2, LST1, LST1, LST1, LST1, LST1, MAFB, MNT, Mar-02, MPEG1, MPEG1, MS4A6A, MUC4, MUC5AC, NF1, NFIX, NPPB, NUPR1, NYX, OXCT2, PALLD, PAPLN, PARD6G, PIK3AP1, PILRA, PRDM12, PRDM8, PRKD2, PSG5, RAB40B, RAPGEF3, RASGRF1, RHOV, RIF1, RUNX1T1, SAT1, SIGLEC10, SLC22A7, SLC7A7, SMARCB1, SMTNL1, SNCA, SNCA, SNCG, SNX22, SPON2, TBC1D9, TBX1, TBXA2R, TGFBI, TLE6, TMEM132A, TMEM151B, TMEM176B, TMEM198, TNFSF13B, TPCN1, TRAJ17, TRIM29, TTBK2, TYROBP, USP2, VASH1, VENTX, WIZ, WNK2, WNT6, ZFP36L2, ZNF20, ZNF703	http://www.ncbi.nlm.nih.gov/pubmed/21917308
49	NFKBIZ, ZC3H12A, RELB, BIRC3, CXCL1, ZC3H12C, TNFAIP3, MAP3K8, CXCL2, CASZ1, IER3, LENG1, SOD2, RRAD, NFKB2, ID2, TATDN1, CBR3, CCL3, ICAM1, PIK3R6, GADD45B, ADAM21, ZBTB25	http://www.ncbi.nlm.nih.gov/pubmed/24393021
50	MAP3K8, OPLAH, OR13C2, IER3, TMA16, KRTAP8-1, ZC3H12A, RIMBP3, OR2T10, GPIHBP1, HNRNPCL1, NFKBIZ, PTTG1, BDKRB1, CXCL1, F13A1, IL6, LTF, CXCL10, LRMP, TLR5, NFKBIA, CXCL2, GDPGP1	http://www.ncbi.nlm.nih.gov/pubmed/24393021

51	IL1B, IL6, CSF1, IL1R1, IL27RA, TNFRSF9, TNFRSF12A, IL1RN, CCL4, CXCL1, CCL7, CXCL3, CCL5, CCRL2, CXCL8, RGS1, LIF, CD69, LAT, CD83, ADORA2A, CRIP1, HLA-DQB1, PFDN6, TRAF1, NKG7, PTX3, FCGR2B, TNFAIP6, PTGER2, CLEC5A, GPR183, TREM1, BIRC3, FCAR, TLR2, HIVEP1, FOSB, FOS, EGR3, PHLDA2, SERPINB2, FGFR1, EGR2, INSIG1, PDGFA, IER3, PDGFB, BTG2, KLF10, PLK3, NAMPT, TNFAIP3, TNFAIP8, MARCKSL1, CRABP2, IRF2, RASAL1, FLRT2, SMARCD3, RND3, KAL1, FLNB, CD151, ARF6, ALCAM, MAFF, MSC, NFKB1, BCL6, NFATC1, ATF3, NFKBIA, NFKBIE, MYC, EMP1, ELL2, TOP2A, GTF2H2, DUSP2, THBD, NR4A2, GEM, OLR1, GCH1, SPHK1, NDUFA7, HBEGF, JAG1, LDLR, SMAD7, MALT1, SPRY2, DUSP6, MAP2K3, CREM, DUSP1, MAP3K14, FUT4, JUN, CYTIP, FYN, PGGT1B, VRK2, AKAP13, TTK, ENC1, SLC16A6, HIST2H2AA3, CYP3A4, HIST1H1C, NDC80, STK17A, PELI1, KCNAB1, B4GALT4	http://www.ncbi.nlm.nih.gov/pubmed/16911805
52	MS4A2, TPSAB1, TPSAB2, CPA3, RGS13, C1orf186	http://www.ncbi.nlm.nih.gov/pubmed/27677865
53	CLC, CPA3, DNASE1L3, IL1B, ALPL, CXCR2	http://www.ncbi.nlm.nih.gov/pubmed/24582314
54	CD83, JMJD6, STAT4, TRAF1, SLC7A5, TBCD, NFKB1, CD44, DESI1, NELFE, XCL2, IL4R, DUSP2, DUSP4, NUP188	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC125382 6/
55	ADAM28, CNR2, FFAR3, LGALS12, PRSS33, SPNS3, ADAM8, CORO1A, FHL3, LTC4S, RAB37, TESC, ARAP3, CYP4F12, GGT5, MCTP2, RAB3D, TNFSF14, ASB2, DACH1, GPR56, MMP25, RD3, TREML2, ATP2A3, DAPK2, GPR97, NHSL2, RNASE2, TRPM6, CASS4, DGKD, ICAM3, P2RY2, RNASE3, TSPAN18, CD300LB, EMP4P, IFITM1, PADI2, SIGLEC10, VSTM1, CD69, FAM101B, IL1RL1, PADI4, SIGLEC8, CDA, FAM65B, IL5RA, PGLYRP1, SLC24A3, CHST15, FFAR2, KIF21B, PIK3R6, SORL1	http://www.ncbi.nlm.nih.gov/pubmed/23844029
56	CLC, SIGLEC8, EMR1, EMR4P, LGAL312, HRH4, CEBPE, DACH1, VSTM1	http://www.ncbi.nlm.nih.gov/pubmed/27677865

57	CXCL10, IFIT1B, MX1, MX1, OASL, IFIT2, CMPK2, HAS2, RSAD2, HAS1, RSAD2, CXCL11, CSF1, TNFAIP6, IFIT1B, GBP2, RSAD2, RTP4, IRGM, RND1, GBP4, RTP4, IFIH1, IRGM, CMPK2, HAS2, CXCL9, IRGM, IFNB1, CSF1, IL6, ADAMTS4, STAT1, PTX3, GEM, TNFAIP3, PARP14, GBP6, ADAMTS4, DDX58, PYHIN1, FAM26F, TNFAIP2, USP18, MMP13, CCL4, CCL8, CCL11, PYHIN1, MT1H, PLSCR2, TNFAIP3, VCAM1, ADM, CXCL11, C12orf75, ATF3, CP, CCL20, CXCL9, TIMP1, SLFN11, HPX, SAA1, IFI44L, CCL22, NTS, CH25H, IRG1, IFI44L, FGG, MT1A, RGS16, CXCL3, CXCL3, CXCL3, CXCL6, CXCL8, LEP	http://www.ncbi.nlm.nih.gov/pubmed/22990623
58	NHLH1, CMPK2, IFIT2, CMPK2, GBP4, MX1, RSAD2, TOR3A, CD274, HERC6, DDX58, HERC6, HERC6, SAMD9L, STAT1, HERC6, GBP4, GBP2, GBP4, RNF213, MX1, ZNFX1, MITD1, PARP14, CXCL10, IRGM, GBP2, SETDB2, STAT1, IFIT1B, EIF2AK2, ENPP4, WARS, IRGM, IRGM, ATM, ASB13, WDR19, OASL, PML, PML, TLR3, IFIH1, RTP4, TOR3A, IFIT1B, SLFN11, ASB13, DDX60, STAT2, PARP11, TRIM5, STAT2, STAT1, TOR3A, TRIM6, RBL1, CXCL11, WDR19, DDX58, PARP9, TRIM21, USP18, WARS, DDX60, GBP2, DTX3L, IL15, GBP6, ENPP4, SLFN11, SECTM1, ADAR, MLKL, XAF1, RSAD2, INPP1, ZUFSP, WARS, MITD1, TRAFD1, RTP4, DHX58, UBE2L6, IDO1, LY6E, STAT1, IFI35, RSAD2, TRIM34, NAMPT, GNB4, CXCL9, NMI, IFI35, CXCL9, PLSCR2, PNPT1, HAS2, TRIM14, NLRC5, CXCL11, PYHIN1, DDX58, IRF9, HAP1, ZBP1, BATF2, IRF7, PYHIN1, DTX3L, DAXX, ZBP1, IFI44, KATNA1, SPATS2L, ADAR, Mar-05, PNP, NCOA7, SLFN5, FAM26F, SP100, IFI44L, RAB19, CX3CL1, ZNF836, PLEKHA4, SLFN11, ISG20, MISP, IFI44L, SERPINA3, CD40, SPPL2A, IFNB1, AIM1, MMP13, UBA7, ADAR, VCAM1, ZC3HAV1, SPATS2L, IFI44L, ATM, TOR1AIP2, TTC39B, DHX58, TMEM171, MOV10, CD40, PAPD7, TNFAIP6, SLFN12, PSMB8, LGALS9C, PARP14, ASAP3, TTC39B, HAS2, PSMB9, TAPBPL, ZSWIM5, CCRL2, CD40, CASP4, ATP10A, AREL1, DCP2, IL6, CCL5, UPP1, SLFN5, ECE2, APOL6, GCH1, CTRL, SP100, CX3CL1, CSF1, LAG3, IL18BP, TTC39B, TMEM106A, PNPT1, SPATS2L, TRIM25, RNF114, PLAC8, FCGR1A, SLC15A3, USP25, NAMPT, SLFN12, EPSTI1, GGT5, XAF1, CD69, CACNB4, SOCS1, MS4A4A, TLR2, ATF3, OAS3, SAMHD1, PYHIN1, GCH1, PPP1R14D, ASB13, TRIM5, LYPD8, NFKBIE, ARHGAP8, CSF1, CASP1, ZC3HAV1, PLA1A, BRIP1, CD86, SOCS1, CCL8, LGALS3BP, OSMR, CCL4, ETNK1, OAS2, TIFA, EPSTI1, ARID5A, PPA1, XDH, TNFAIP3, CNR1, NFKBIE, MS4A4A,	http://www.ncbi.nlm.nih.gov/pubmed/22990623

	ERVFRD-1, CA13, PARP11, MARCKSL1, VCAM1, GLIPR2, LRRC4, SECTM1, GEM, RND1, PTX3, ARSI, AFTPH, NPC2, VCAN, GLIPR2, DNASE1L3, ABTB2, MS4A6A, SLC2A6, CA13, FRAS1, PAPSS2, MXD1, HSPBAP1, B2M, FAP, SLFN5, PCGF5, VCAM1, EPSTI1, MB21D1, ADAMTS4, PTPN2, IFNG, FCGR1A, GZMB, VCAN, POU3F1, CA13, TFPI2, TNFAIP3, VNN1, PML, IAPP, UBD, IRG1, ADAMTS6, IAPP, IAPP, RTN4RL2, DCK, TNFAIP2, RGS1, BCL3, CSRNP1, SLFN12, ADAMTS4, MT1H, KLRK1, VNN1, MSR1, IL12B, CH25H, NTS, CCL22, PYHIN1, IL1RN, TNF, CP, SOCS3, RAD54B, CCR2, TIMD4, TIMP1, XCL2, NAV3, IFITM1, HPX, DDX4, MS4A6A, GZMA, DCK, FCGR3B, CXorf21, NCR2, GPR84, MBD1, MSR1, IL1RN, SELP, IL1RN, MSR1, NCR1, SAA1, SLFN12, CCL3L1, MT1A, CXCL3, FGG, CXCL3, RGS16, CXCL3, ORM2, C15orf48, CXCL8	
59	KIF26B, CXXC4, DCDK1, FMO3, SPTSSB, 37865, HMGCS2, ADH7, RAB17, ASGR1, HEPACAM2, CCDC176, CLDN8, SYT17, PCLO, TMEM232, GDF10, ATP6V1B1, C11orf87, CDH26	http://www.ncbi.nlm.nih.gov/pubmed/22990623
60	IFIT2, CMPK2, CXCL9, IL18BP, CXCL10, STAT1, CXCL11, CD274, GBP4, HERC6, HERC6, MX1, HERC6, ZBP1, RNF213, RSAD2, TRIM5, BST2, IRF7, GBP2, LAG3, IRGM, IRGM, TOR3A, SAMD9L, OASL, MX1, XAF1, IFI44L, STAT2, IDO1, SPPL2A, ZNFX1, HERC6, STAT2, IRGM, CXCL9, GBP4, IFIT1B, PARP11, UBE2L6, ZBP1, PYHIN1, IFI27, IFI35, TOR3A, CMPK2, PYHIN1, USP18, LGALS3BP, DDX60, RTP4, RSAD2, MLKL, GBP2, STAT1, COL11A2, MS4A6A, UBA7, ISG20, GBP2, ADAR, DTX3L, IFIT1B, DHX58, GBP6, DHX58, TRIM34, RTP4, MS4A4A, OAS3, RSAD2, DDX58, IFI44L, MTHFD2, IFI44, IFI44L, TRIM6, DDX60, IRF9, PML, IFIH1, FCGR1A, PLA1A, PSMB8, CXCL11, CNGB3, EIF2AK2, PARP9, FCGR1A, NMI, MS4A4A, LYPD8, SECTM1, GZMB, NLRC5, APOD, MS4A6A, TRIM5, PLEKHA4, CLEC4A, CCR2, PSMB9, APOL6, DNASE1L3, MTHFD2, SLFN11, EPSTI1, PLAC8, ACP2, LAIR2, LGALS9C, TMEM106A, SIGLEC1, PML, FAM26F, IL1RN, GPR84, TAPBP, C2, LY6E, TMEM106A, HAP1, LAIR2, XCL2, SPATS2L, IL1RN, AIM1, OAS2, HCK, BATF2, EPSTI1, TRIM14, SLFN12, STAT1, IL1RN, CCL5, SLAMF9, UBD, MSR1, HPSE, OCSTAMP, FCER1G, AIF1, PYHIN1, DNASE1L3, LAIR2, MSR1, EVI2A, SCT, NAIP, ZC3HAV1, KLRK1, CST7, DCK, CCL8, MSR1, DAXX, SLC39A2, TLR3, CASP4,	http://www.ncbi.nlm.nih.gov/pubmed/22990623

	TGFBI, SLFN12, PYCARD, ADAR, TREML4, SLC2A6, SETDB2, THEMIS2, MSR1, SERPINA3, TIMP1, IL6, GNGT2, SLC15A3, VCAN, FCGR2A, NCR2, CCL4, CCR2, TRIM21, CYBB, SIRPG, IKBKG, BEX4, CA13, CYBB, FGR, VCAM1, CASP1, CCR2, SLFN11, SLC7A5, IRG1, CLEC5A, DDX58, SLFN5, FCGR3B, DCK, KLK1, CA13, RUNX3, TIFAB, APOBEC1, PARP14, MYO1F, AFTPH, MISP, EMR3, TLR7, XDH, SLAMF7, SEMA4D, PLEK, PRF1, AFTPH, DCP2, CYBB, TNFRSF1B, CD86, SLAMF8, HAVCR2, GLIPR2, KLK1, FPR2, IGSF6, NAMPT, CD180, SPI1, VCAN, TGFBI, SLFN11, TRIM25, HPX, LST1, CXorf21, SLFN12, XAF1, GLIPR2, BID, VCAN, PTPN6, NFKBIE, NFKBIE, C3AR1, MILR1, CD69, IFI27, PLD4, PPA1, ORM2, UPP1, PLEK, C3AR1, Mar-01, TLR2, GCH1, FASLG, VCAM1, SPIC, FASLG, CXCL13, P2RY13, GPR35, IL12B, CD48, DDX4, GZMB, SPIC, CA13, IL2RB, SFRP1, CD68, CLEC4A, PARP11, CTSW, SERPINA3, ABCB1, PILRB, CD80, CD40, KLRB1, TIFAB, GPR65, LCP2, FCGR2A, RGS1, VNN1, EPSTI1, C15orf48, EMR3, LILRB2, CCR9, GPR114, FOSL1, CD300A, SAA1, MS4A4A, CH25H, VAV1, FCGR2A, DCLK1, CD33, B2M, GZMA, MS4A7, CCR9, NKG7, IL12B, CCR2, CXCL13, SAMSN1, HAVCR1, KLRB1, RASA4, COCH, PTPRO, GPR171, C3AR1, FGR, NCR1, NCF4, CCL8, POU3F1, PLA2G7, CLEC4E, F10, FCGR2A, IFITM1, SLFN12, CD8A, LCP2, CLEC6A, CD8A, CXCL3, TLR1, GZMK, LPXN, ITIH1, DUSP2, TBX21, SELP, CD72, CD8A, SELL, FYB, ADM, UPB1, CLEC4E, RNASE6, KLK1, TNFRSF9, LAT2, OOEP, VNN1, PTPN2, CXCL3, CLEC6A, IL2RB, PIWIL2, CXCL3, TNF, CCR2, TNFRSF9, MAB21L3, TNFAIP2, ATF3, LCN2, ERVFRD-1, IL18RAP, AOAH, SECTM1, CCR2, ZC3H12A, IFNG, IFNB1, CXCL6, CD244, TLR7, CCR1, IL10RA, CSF3, CCL3L1, CD53, GIMAP7, TNFAIP6, FST, NOXO1, RGS16, CCR1, RFPL3, CXCL8, EOMES, CCL15, ADAMTS4, KLRC2, SLA2, GPR176	
61	GLS, HEPACAM2, RELN, GRIA1, GPC6, ACAA1, GRIA1, DIRAS2, GSTA1, LRRC17, HTRA3, FCRL2, GDF10, GPC6, ASGR1, DNAH6, SLC7A10, PON1, RYR3, DNER, NOTUM, KIF26B, GNG4, RBFOX3, FAT3, CD207, BCAN, CD163, SYT17, PER1, SHISA9, CES2, DCDK1, NTM, ATP6V1B1, SCARA5, DNER, KLF15, FMO3, CNTN4, GLB1L3, CYP1A1, ANGPTL7, OLFM2, CD209, C11orf87, FABP1, FABP1, HPCAL4, NTRK2, DHRS7C, TTN, TMEM182, TTN, TTN, MB,	http://www.ncbi.nlm.nih.gov/pubmed/22990623

62	IRF7, APOD, ZBP1, IFI44L, CXCL10, GBP4, PYHIN1, PYHIN1, ZBP1, IFI44, CXCL9, IFIT1B, CXCL11, LY6E, LGALS3BP, USP18, DDX60, SIGLEC1, GBP6, RTP4, LAIR2, MX1, IFI44L, BST2, MX1, RTP4, MS4A6A, XAF1, C3AR1, DDX60, SLAMF9, C3AR1, CMPK2, STAT1, CCR2, FCGR1A, OASL, IFIT2, MS4A4A, FCGR1A, OAS3, C3AR1, LAIR2, IL18BP, OAS2, AIF1, DHX58, LAIR2, CCR2, IRGM, HERC6, TM4SF5, APOC2, SLFN12, MS4A7, CNGB3, MS4A4A, MS4A6A, HERC6, IFI44L, APOBEC1, CCR2, FCGR2A, HERC6, RSAD2, PLA1A, MSR1, CXCL9, GDF3, TIMP1, IL12B, RSAD2, SLFN11, CLEC4A, CCR2, SIRPG, HERC6, B2M, SAA1, IFI27, NLRC5, CLEC4A, CCR2, FCGR2A, EPSTI1, CCL5, CLEC5A, BEX4, CCR2, CD72, SLFN12, MSR1, EPSTI1, TRIM5, MILR1, STAT1, XCL2, FCGR2A, FCGR2A, LPXN, DCK, GPR114, GPR65, MSR1, LST1, VNN1, DHX58, FAM26F, RSAD2, CCR1, MSR1, SAA4, CCL4, CCL8, NCR2, CXCL3, PYHIN1, CCR9, KLRK1, GZMK, IRG1, HAVCR1, PARP14, CCR2, MS4A7, RGS1, CXCL3, CXCL3, KLK1, CH25H, FYB, CXorf21, HPX, GPR35, CD180, FCGR3B, CXCL13, SLFN12, IL6, TLR1, KLK1, CXCL6, ORM2, TNFRSF9, CA13, KLK1, KLRB1, GZMB, C15orf48, EMR3, RGS16, CXCL13, ADAMTS4, CYBB, CXCL11, IL1RN, RFPL3, SLC26A4, CXCL8, UBD, CCL3L1, IFNG, IL1RN, ORM2	http://www.ncbi.nlm.nih.gov/pubmed/22990623
63	GRIA1, GRIA1, HEPACAM2, ACAA1, CNTN1, ASGR1, CD207, CD209, SCARA5, FABP1, FABP1, ITGB1BP2, SLC47A1, MYL3, MYL3, MYL3, MB, MYL7, TNNC1, MYL4, SMPX, RYR2, TTN, TTN, CASQ2, PGAM2, CKMT2, SRL, TTN, DHRS7C, CA3, TRDN, TCAP, TTN, TNNT2, LDB3, CFD, MYOZ2, TNNI3, TNNT2, MYBPHL, CSRP3, TXLNB	http://www.ncbi.nlm.nih.gov/pubmed/22990623
64	IRF7, APOD, CCNA1, PYHIN1, IFI44L, TOMM20L, PYHIN1, IFI44, IFI27, IFI44L, IFIT1B, MS4A7, OAS2, CXCL10, MX1, DDX60, ZBP1, CCR2, C3AR1, ZBP1, SPAG5, CXCL9, SAA1, CCDC67, CCR2, FCGR1A, KLK1, KLK1, OAS3, MX1, MS4A4A, SRSF11, NCAPG, CDK10, CEP55, MS4A4A, CCR2, ESCO2, CCR2, OASL, RGS1, SLFN12, IL12B, KLK1, ORM2, CXCL11, CXCL8, IRG1, CXCL3, CXCL3, CXCL3, SLC26A4, AGR2, CLCA1	http://www.ncbi.nlm.nih.gov/pubmed/22990623
65	APOD, IRF7, MS4A7, PYHIN1, C3AR1, C3AR1, CCL8, CCR2, MS4A7, PYHIN1, CCR2, C3AR1, CCNA1, IFI44L, SPAG5, TOMM20L, MX1, CDK10, CXCL9, IFI27, IL12B, SAA1, CEP55, OAS2, HAL, IFI44L, ESCO2, CXCL10, RGS1, HMMR, CH25H, CXCL11, ESCO2, C15orf48, ORM2,	http://www.ncbi.nlm.nih.gov/pubmed/22990623

	CXCL8, IRG1, AGR2	
66	CNTN1, CD209, FABP1, FOSB, ZBTB16,	http://www.ncbi.nlm.nih.gov/pubmed/22990623
67	GDF15, AEN, CCNG1, CDKN1A, EDA2R, CELF5, DDIAS, PSRC1, THEM5, PSAPL1, SAA1, CXCL3, CXCL10, RSAD2, ORM2, CCL20, CXCL6, TIMP1, CXCL8, CCL8, SLC26A4, IL6, ADAMTS4, CXCL9	http://www.ncbi.nlm.nih.gov/pubmed/23565148
68	HERC6, VCAN, RSAD2, MX1, IFIT1B, DHX58, IFI44, IRF7, CXCL11, CXCL10, OAS3, FCGR1A, GDF15, MS4A6A, CXCL8, ZBP1, OASL, CYP7B1, DDIAS, SAA1, EDA2R, OAS2, APOD, SERPINA3, CELF5, CXCL3, TIMP1, PSRC1, CCL8, SECTM1, C15orf48, CCR2, CH25H, ORM2, MSR1, FOSL1, IRG1, CXCL6, SPINK1, LIF, SLFN12, IL6, CXCL9, IL1RN, EREG, MORC1, CXCL13, TNC, CHL1, CD177, BCAT1, ADAMTS4, SPRR1B,	http://www.ncbi.nlm.nih.gov/pubmed/23565148
69	BEX2, ATP6V1B1, ASGR1, ACVR1C, PCK1, ADIPOQ, CA3, TMEM45B, CFD	http://www.ncbi.nlm.nih.gov/pubmed/23565148
70	CWH43, NTM, SFRP1, IL23A, SPRR1B, FCGR2A, PSRC1, CLDN4, GPNMB, CLEC5A, CDCA8, ATG9B, C3AR1, DCSTAMP, CCNG1, TREM2, CENPH, EXO1, TPX2, DDIAS, CPA4, CHODL, C1QA, NRIP3, AURKB, PIF1, C1QB, TFPI2, PLA1A, FST, PKHD1, GAS2L3, MSR1, SPP1, SHCBP1, C1QC, CCNB2, WFDC12, CLDN6, CCNA2, LRR1, FIGNL1, CHL1, FCRL2, NRCAM, CDCA3, BRINP1, SPC25, CLSPN, STIL, KIAA0101, TRIP13, CEP55, CD200R1L, CDCA5, SKA1, PTGER4, KIF11, VCAN, MMP10, CLEC4A, KIF2C, CCR2, SERPINB2, KIAA1524, CYP7B1, HTR7, C15orf48, GTSE1, VSIG4, PARPBP, CLEC6A, EDA2R, SERPINA3, NCAPG, MIS18BP1, CERS3, KIF18B, SPAG5, RAD51, COL24A1, MS4A6A, CGREF1, CDKN3, TK1, S100A14, NUSAP1, CDK1, GPR85, ELN, CCL17, TNC, FN1, CCL8, TIMP1, DTL, CENPE, P4HA3, CHSY3, E2F8, DEPDC1, ASPM, CENPP, CDK10, TTK, GPR176, GJB4, GATM, DMP1, EREG, THBS4, IQGAP3, CHEK1, FAM3B, RGS16, ESCO2, GJB5, CA13, CASC5, RTN4RL2, UBE2C, FCGR1A, HTR4, HMMR, KLHDC8A, RAD51AP1, MS4A7, TGM1, CCL15, AADAC, PBK, FBN1, DDIT4L, WISP1, LIF, PRSS22, E2F7, HAS2, GDF15, FXYD4, GLOD5, ADAMTS12, GCNT3, LAMA1, CSMD1, HNF4A, FKBP5, CDKN1A, MMP13, CENPF, CXCL10, FOSL1, ACKR1, ALDH1A3,	http://www.ncbi.nlm.nih.gov/pubmed/23565148

	SLC26A4, CCR1, SAA1, SECTM1, CEMIP, TUBB3, CILP, RHBDL2, BCL2L15, BCAT1, PTX3, CALCA, CELF5, CXCL9, ADAMTS4, IL1RL1, SPINK1, CLDN2, CH25H, IL1RN, CXCL13, TFAP2A, MORC1, ORM2, CD177, IL6	
71	IGFBP3, ECM2, ASGR1, SLC7A10, CYP1A1, KIAA0408, FABP1, BCAN, CST8, SNCA, ALAS2	http://www.ncbi.nlm.nih.gov/pubmed/23565148
72	THBS4, ANKRD34B, PSRC1, FN1, ELN, SFRP1, TREM2, COL24A1, NRCAM, EXO1, KIF11, PIF1, CDCA8, CD200R1L, COL5A2, FXYD4, CDCA2, PKHD1, THBS2, CHODL, AURKB, CCNA2, P4HA3, KIAA0101, STIL, ZRANB3, C3AR1, C1QB, AADAC, LHFPL2, GAS2L3, GLOD5, ADAMTS12, ILDR2, CTHRC1, C1QA, TPX2, TNC, CLEC6A, FBN2, C1QC, CCNB2, CEP55, CDK10, TTK, LRR1, CENPF, CFI, CDCA3, ADAM12, SPP1, SYT13, DEPDC1, CTSK, CCR2, CDK1, CASC5, SKA1, KIF18B, PTX3, CSMD1, FMOD, LAMA1, MIS18BP1, NCAPG, ASPM, CLSPN, CILP, DCSTAMP, GPNMB, SPAG5, CLEC5A, RAD51, FRZB, MS4A7, BRINP1, EDA2R, DDIAS, KIF2C, ATG9B, CHSY3, DTL, FST, E2F8, SHCBP1, IQGAP3, CERS3, GPR176, SPRR1B, PARPBP, UBE2C, CDCA5, CEMIP, CENPP, CDKN1A, MMP10, DMP1, HAS2, TMEM26, PBK, FBN1, CDKN3, E2F7, MSR1, CENPE, PLA1A, NUSAP1, CHL1, COL5A3, ESCO2, CLDN4, RAD51AP1, TUBB3, IGF1, IL1RL1, HMMR, MS4A6A, MEGF10, EREG, TIMP1, WFDC12, PDCD1, MMP13, CTLA4, FCGR1A, C15orf48, TFAP2A, CELF5, ADAMTS4, ACKR1, CCL8, IBSP, RGS16, LIF, PRND, IL1RN, GREM1, BCAT1, FOSL1, CXCL10, SAA1, SLC26A4, CXCL9, IGJ, IL6	http://www.ncbi.nlm.nih.gov/pubmed/23565148
73	IGFBP3, ASGR1, BEX2, TMEM132D, SLC7A10, CYP1A1, NRN1, KCNA2, FABP12, FABP1, CST8, GRIA1, ANKRD63, KRT79, CIDEC, CYP2E1, CA3, RETN, ADIPOQ, PCK1, CFD, TMEM45B, SMPX, NPPA,	http://www.ncbi.nlm.nih.gov/pubmed/23565148
74	CD200R1L, CLEC6A, ATP6V0D2, LHFPL2, PSRC1, ANKRD34B, FXYD4, ZRANB3, AADAC, CTSK, OLR1, TREM2, F7, GPNMB, MS4A6A, SLC26A4, CCR2, MSR1, EDA2R, MMP13, EREG, COL24A1, MS4A7, CDKN1A, CCL3L1, TNC, SPRR1B, IL1RL1, CEP55, PTX3, C3AR1, IL1RN, ESCO2, DMP1, CCL8, RGS16, CHODL, SAA1, CHL1, IGJ, ADAMTS4, ORM2, GP2, IL6	http://www.ncbi.nlm.nih.gov/pubmed/23565148
75	CNN1, BEX2, GRIA1, ANKRD63, NR4A1, TNNT3	http://www.ncbi.nlm.nih.gov/pubmed/23565148

76	TREM2, ZRANB3, ANKRD34B, CLEC6A, PSRC1, GPNMB, FXYD4, COL24A1, THBS4, MS4A7, MSR1, DMP1, SERPINB5, CLEC4D, IL1RN, SPRR1B, CHODL, IGJ, TNC, EREG, PKP1, CHL1, SAA1	http://www.ncbi.nlm.nih.gov/pubmed/23565148
77	BEX2, TMEM132D, SLC4A1, FABP1, TBX20, KCNJ3, TRDN	http://www.ncbi.nlm.nih.gov/pubmed/23565148
78	PSRC1, TREM2, ZRANB3, CLEC6A, SLC26A4, FXYD4, CDKN1A, TNC, MS4A7, MS4A6A, GPR176, EREG, COL24A1, NTRK2, GPNMB, C3AR1, IGJ, CCL8, SPRR1B, RGS16, TFAP2A, DMP1, CHL1, CHODL, SAA1, IGHM, ADAMTS4, CXCL9	http://www.ncbi.nlm.nih.gov/pubmed/23565148
79	ABLIM3, ADAMDEC1, ADM, ADORA3, ALOX15B, ANGPTL4, ARID5B, BIN1, C1QB, CAMP, CCL7, CCL8, CD163, CES1, CES1P1, CYFIP2, DAAM2, DDIT4, DHRS9, DPYSL3, FBLN5, FKBP1A, FKBP5, FLVCR2, GADD45B, GLDN, HIPK2, HPGD, HS3ST2, HTRA1, IL1R2, IRS2, KCNMA1, KLF9, MERTK, METTL7A, METTL7B, MFGE8, MMP19, MS4A6E, MT1A, MT2A, MTMR11, MTSS1, NAPSB, OLFML2B, PAPSS2, PCOLCE2, PDK4, PHLDA1, PLIN2, PMP22, PPARGC1A, PTGER2, RBP7, RCAN1, RNASE1, SDC4, SERPINE1, SERPINF1, SESN1, SH3PXD2B, SLA, SLC16A10, SLC16A6, SLC1A3, SLC29A1, SPRY1, SRPX, TBC1D16, TCN2, TFCP2L1, TFPI, THBS1, TIAM2, TMEM236, TPST1, TSC22D3, VSIG4, ZCCHC6	http://www.ncbi.nlm.nih.gov/pubmed/24395918
80	ABCG1, ACAT2, ATP8B4, BCL11A, CCL22, CD4, CD74, CD93, CDH23, CHI3L1, CHST13, CIR1, CLEC4A, CYB561A3, CYP27B1, ENTPD1, EPSTI1, FAIM, FCN1, FSCN1, GAL, GBP5, GIMAP4, GJB2, GM2A, GREM1, GSTM1, GSTM2, H2AFY2, HAMP, HCP5, HK3, HLA-DOA, HLA-DPA1, HLA-DPB1, HLA-DQA1, HLA-DRA, HLA-DRB3, HLA-DRB4, HLA-DRB6, HLA-F, HMG20B, HPSE, HSD11B1, HTRA4, IFI27, IFIT1, IL18BP, KIAA0101, LILRA3, LILRA5, LST1, LXN, MMP7, MMP9, MX1, NBEAL2, OAS2, PGD, PLAU, PTGS1, PTTG1, PTTG3P, RARRES1, RARRES3, RASSF4, RGS12, RHBDF1, SCG5, SLC2A5, ST6GAL1, STAT1, TAP1, TDRD9, TGFBI, TGM2, TIMP3, TMEM138, TNFSF13B, TNNI2, TSC22D1, TSPAN32, TXNRD1, VWF, WARS	http://www.ncbi.nlm.nih.gov/pubmed/24395918

81	DUSP1, NFKBIA, TFCP2L1, SRGN, TNFAIP3, AGPAT2, SH2D4A, METTL7A, RHOU, PRDM1, ISG20, ITGB1, CITED2, RABAC1, TXNIP, ABHD5, ERMAP, KLF9, CEBPD, FKBP5, MAL, PDK4, ERRFI1, DDIT4, PERP, AHNAK, ADHFE1, TMEM56, CYSTM1, LYPD6B, ADORA2B, ALOX5AP, KLF5, TSPO, CAPG, CD9, COL4A3, FCER1G, GLRX, LMO7, LOX, RGS1, S100A6, SDC1, RASSF7, VAMP8, MAP3K6, CYTIP, SPRY1, TIPARP, HILPDA, FXYD5, PNPLA2, NCEH1, TMEM243, HOPX, PARD6B, BIRC3, GLUL, SOCS1, TBC1D2, EMILIN2, PRDX6, ANG, ERN1, OLR1, MMRN1, CGN, CCND3, LTB4R, IL6ST, MT1X, MT2A, PER1, PYGB, IL1R2, HOMER2, CCHCR1, CHPT1, DEPTOR, SFXN5, CYP4V2, SEC14L1, SOD2, HRASLS2, TMEM62, ZC3H12A, SLC41A2, TMEM116, RHOB, ATP6V0A1, C5AR1, KLF6, GADD45A, FCGR2A, GCNT1, GCLC, HAGH, FOXN2, KCNK1, MYH6, POU5F1, MAPK13, PXN, MARCO, IL18RAP, PER2, P4HA2, LPIN2, HERPUD1, SPRY2, FSTL3, SERINC3, ELL2, ZNF281, PIK3R5, MKRN1, RASD1, SLC37A1, EPB41L4B, TRIB3, TMEM8A, PLEKHF2, SLC16A10, SLC25A29, RNF149,	http://www.ncbi.nlm.nih.gov/pubmed/25192440
82	HLA-DRB1, MDK, PASK, CDKN2C, E2F7, TNFSF10, AURKA, ADAM19, CKAP4, SPDL1, CDK1, VCAN, DBN1, IGFBP4, KIF20B, DEPDC1, CENPK, BORA, HLA-DMA, ST8SIA4, C12orf75, CAMK4, CYP1A1, DDIT3, DNMT3A, GEM, GUCY1A3, ITGA1, LCK, PDE4B, PDGFRB, PLK1, SOX4, SPIB, ZEB1, ZNF207, FZD3, ENC1, BHLHE40, IER3, NREP, GDF15, IER2, ZEB2, PLK2, FNBP4, ANGPTL2, SLC39A6, PARM1, RND1, UBE2T, DACT1, ARRDC3, MARCKSL1, C1orf54, VASH2, NETO2, CDCA3, AFAP1L2, SGOL1, TUBB2B, TCF7, BCL2, HES1, PHIP, PKIA, TIA1, GIT2, CCDC88A, ABLIM1, SLC5A3, WIPI1, MAP3K8, SMARCC1, MAP3K14, INTS6, EPHB1, HOXB2, ID3, ITGA4, MEF2D, NAB2, CDK17, POLB, ST3GAL2, TNFSF9, SUCLA2, TRAF4, CLCF1, PPP1R15A, RASGRP3, MOXD1, SERTAD3, EVL, DPH5, ZFR, BCL11A, ACKR3, PELI1, PLEKHG1, TGIF2, DOCK7, L3HYPDH, MB21D1, RHOV, ARL5B,	http://www.ncbi.nlm.nih.gov/pubmed/25192440
83	DUSP1, NFKBIA, TFCP2L1, SRGN, TNFAIP3, AGPAT2, SH2D4A, METTL7A, RHOU, PRDM1, ISG20, ITGB1, CITED2, RABAC1, TXNIP, ABHD5, ERMAP, KLF9, CEBPD, FKBP5, MAL, PDK4, ERRFI1, DDIT4, PERP, AHNAK, ADHFE1, TMEM56, CYSTM1, LYPD6B, ADORA2B, ALOX5AP, KLF5, TSPO, CAPG, CD9, COL4A3, FCER1G, GLRX, LMO7, LOX, RGS1, S100A6, SDC1, RASSF7, VAMP8, MAP3K6, CYTIP, SPRY1, TIPARP, HILPDA, FXYD5, PNPLA2, NCEH1,	http://www.ncbi.nlm.nih.gov/pubmed/25192440

	TMEM243, HOPX, PARD6B,	
84	HLA-DRB1, MDK, PASK, CDKN2C, E2F7, TNFSF10, AURKA, ADAM19, CKAP4, SPDL1, CDK1, VCAN, DBN1, IGFBP4, KIF20B, DEPDC1, CENPK, BORA, HLA-DMA, ST8SIA4, C12orf75, CAMK4, CYP1A1, DDIT3, DNMT3A, GEM, GUCY1A3, ITGA1, LCK, PDE4B, PDGFRB, PLK1, SOX4, SPIB, ZEB1, ZNF207, FZD3, ENC1, BHLHE40, IER3, NREP, GDF15, IER2, ZEB2, PLK2, FNBP4, ANGPTL2, SLC39A6, PARM1, RND1, UBE2T, DACT1, ARRDC3, MARCKSL1, C1orf54, VASH2, NETO2, CDCA3, AFAP1L2, SGOL1, TUBB2B	http://www.ncbi.nlm.nih.gov/pubmed/25192440
85	MLLT4, ELL2, NMT2, SLC43A3, IL4I1, MCOLN2, MAOA, ZFP36L1, APOBEC3A, TXN, FTH1, CCL7, ACSL1, CCL23, VWA8, RBM47, RPLP1, HSP90B3P, RHBDF2, RPN2, HNRNPC, HMGN2P46, SDF4, FABP5, ANXA2P1, TNIP1, TNIP3, LILRB1, TIMP1, PSTPIP2, MARCKSL1, ADAMDEC1, SLC3A2, SRC, NMI, CYP27B1, KYNU, WSB2, SLC41A2, IL3RA, S100A12, VRK2, YWHAG, CXCL5, ATP2C1, NFS1, BID, MTF1, PPBP, PPP2CB, PDE4DIP, CCL5, SLC2A6, CXCL6, CD40, FABP5P3, IFIH1, LAD1, SDC2, GPR84, C1orf122, LILRA3, CFLAR, CAPZA1, LGALS3, GCH1, EIF1AX, P2RX4, NFE2L3, SLBP, CLIC4, MMP12, ACP2, MYC, ARL6IP1, ATP11B, ZSWIM4, VPS37A, SRGN, FTH1P3, TDP2, OAS3, C6orf211, SMAD7, SMARCA5, HSPA13, GPBP1, PARP10, BOLA2, NUP62, IL7R, G3BP1, LARP4, LILRB4, ILK, SLC16A3, GRINA, C1QTNF1, SOD2, FAM129B, RPS29, TPI1, LOC440704, HSPB1, MT1H, EXOG, CD68, PTMA, MT1X, KIAA1147, PDIA3P1, MT1IP, MT1E, GYPC, TPT1, SLC29A1	http://www.ncbi.nlm.nih.gov/pubmed/24530056
86	DCK, CAT, EIF4B, P2RY13, SLC2A9, CPED1, ATP2B4, HENMT1, FGL2, EEF1B2, SRSF6, QPRT, PTEN, ACAT2, RNF7, RAB11A, CUTA, RAB7A, AGTPBP1, TSPAN32, ETFA, HADH, C14orf159, GSTK1, FLOT2, PRKAR1A, GNS, C5, ALAD, TMEM131, AP1S2, BHLHE40, GPN1, CPNE3, MPPE1, NDUFA1, ATP6V0E2, DOCK2, MGST2, ARHGEF6, HCP5, LRMP, HEXB, NDUFB5, LY86, PBX3, PQLC3, RNF125, ESYT2, RGS18, RPS4X, VAMP8, TMEM256, ARHGAP15, ERP29, NUDT1, ACACA, ATP5A1, NAA20, ACTR2, CHN2, FBXO33, SLC25A3, PLEK, ALG13, SNCA	http://www.ncbi.nlm.nih.gov/pubmed/24530056

87	CD69, HAPLN3, C15orf48, DUSP5, LGALS3BP, ISG20, LILRA3, AARS, C1orf228, IRF8, TMEM38B, SERPING1, MTHFD2, HCAR3, APOBEC3A, AIM2, PTPN1, JAK2, LAP3, B4GALT5, MT2A, NCOA7, CCND1, STAT1, BATF2, STAT2, MT1A, RHBDF2, PARP14, PSAT1, NCF1, MAP3K7CL, GBP1, RARRES3, SCO2, IFIT3, CD274, CPD, FEM1C, TGM2, LONRF1, BTG3, SLC1A5, IRF1, EXOG, C2, SLAMF7, CD86, ADAMDEC1, SIK1, C18orf8, SLC7A5, STX11, ARID5B, ASCL2, IL15, LYSMD2, GK, BHLHE41, SLCO4A1, WARS, PARP9, HIST2H2BE, TMEM140, KYNU, IFIT2, TAGAP, CXCL9, TSC22D3, TAP1, GREM1, APOL3, PTRF, RIPK2, P2RX7, HPS3, HLA-F, BPI, HIST2H2AC, UBE2L6, SLAMF1, GBP4, CCL8, GBP2, CFB, SSPN, IL1B, LRRK2, SCML1, ITGB7, TAP2, KLF9, FAM126B, SLC6A12, IFIH1, PDE4B, LILRB3, GPR84, TNFAIP6, PSME2, HELZ2, TSC22D1, GPC4, CRISPLD2, CXCL10, DDX60, PLEK, ASNS, IRF7, SAMD9L, ANKRD22, TNFSF10, BTN3A1, RHBDF1, XRN1, VAMP5, MYOF, FAM129A, C12orf57, GCH1, NINJ1, SCG5, FAM26F, CCL5, NCF1C, GBP5, HLA-H, MT1IP, AKIRIN2, SNX10, MT1E, HLA-A, PPARGC1B, CD38, AK4, LILRB4, ATF3, PSMB9, PSMB8, DUSP10, LAT, SOD2	http://www.ncbi.nlm.nih.gov/pubmed/24530056
88	CAT, FHOD1, ZNF428, STAB1, PLAU, RBP1, STMN1, TGFBI, ITGB5, NUDT14, SLC18B1, DCAF6, SVIL, FAM198B, CTSD, APMAP, LINC00857, EPDR1, RGS19, GSTP1, NREP, CPVL, PDGFC, TNFSF12, TOP2A, CCL23, S100A4, COLEC12, SNX2, GPR34, EPAS1, FCGRT, NRGN, CLEC4A, SUSD1, CYBRD1, PCED1B, PFN1, CORO1A, PON2, AGRP, F13A1, PEPD, TSPAN4, HADH, MS4A6A, CD163, TLR5, NUSAP1, LDHB, YWHAH, ID3, MMD, CHST13, APOE, RAB3IL1, FOLR2, PCOLCE2, TCEAL4, FUCA1, PLA2G15, SORL1, SLCO2B1, ADAMTSL4, MFNG, PPBP, RAB7B, PLTP, TMEM236, CFD, ATP8B4, CD36, SEPP1, APOC1, MFSD1, DDIAS, RNASE1, ALOX5AP, PNPLA6, NME4, NAIP, MGST2, MYL6, POTEKP, ACTG1, RGS18, TMEM173, ACTB, CXCL5, CYTL1, PPIA, HNMT, DBI, TSPO, NGFRAP1, MS4A4A, AKR1A1, CTSH, CTDSPL	http://www.ncbi.nlm.nih.gov/pubmed/24530056

89	CBR3, CLEC10A, FZD2, CD1C, SIGLEC10, PARM1, CCL26, FCER2, MAOA, MAP4K1, FOXQ1, HOMER2, PDXK, GALNT18, NAGPA, CD209, INSIG2, RTKN, SUCNR1, NFXL1, FAM60A, FCER1A, DUOX1, ASAP1, CXCR2P1, FGL2, GPD1L, PALLD, QPRT, C17orf58, C1orf54, CMTM8, CARD9, ADAM19, LIPA, SLC27A3, CTNNAL1, ASCL2, CD1A, RAB33A, DHRS2, RASGRP3, GATM, DTNA, RASSF7, ZNF366, BLOC1S6, PTPRE, ACOT7, STARD7, CCDC6, RASL10A, INTS3, ST6GAL1, DHRS11, ADAM15, PTRF, SGK223, PPP1R14A, BATF3, RAMP1, CERK, MMP12, SLAMF1, IL1R2, KIAA1671, SOCS1, RAP1GAP, ALOX15, CD1E, CDKN1A, SOX8, DENND1B, VCL, SPINT2, PFKP, RHBDF1, FSCN1, RRP1B, SNX8, LOC283070, PPM1F, GOLGA8B, ESPNL, CDR2L, NMNAT3, CCL22, TTC9C, CLEC4G, AUH, PTPRO, CLEC4A, CHN2	http://www.ncbi.nlm.nih.gov/pubmed/24530056
90	RBP1, LRPAP1, NUP214, CXCL8, ANKRD33, MLKL, FCN1, DRAM1, VSIG4, DFNA5, TCF7L2, CTSD, GAPT, NCEH1, CPED1, DUSP6, CTSG, CYBB, CXCL2, PGAM4, TOP2A, C5AR1, LTA4H, RHBDF2, CEBPB, GCHFR, JAKMIP2, CYP27A1, AKR1C3, AGRP, AQP9, ADAMDEC1, NFKBIZ, CCL2, STX11, CD163, OLR1, NUSAP1, S100A8, BOK, FOLR3, GLRX, CD14, APOE, SLC11A1, PLSCR1, ITGAL, S100A9, CXCL5, HDDC2, FAM213A, ENG, MCEMP1, PPBP, SCPEP1, TBC1D2, LAPTM5, PLTP, PNKD, IL1B, CLEC5A, ENPP4, CEBPD, CD37, APOC1, SNTB1, PGD, DNASE2, SPARC, ALOX5AP, PLIN2, GPNMB, S100P, FKBP15, IFI30, SLC7A7, NUPR1, SCARB2, PIM1, LYZ, ALDH1A1, CD300LF, HBEGF, FCER1G, DAB2, TMEM173, CYTL1, CD68, WLS, FAM89A, NCF4, SERPINA1, IL7R, NGFRAP1, CTSL, PLAUR, FCGR1B	http://www.ncbi.nlm.nih.gov/pubmed/24530056

91	SELM, EHD1, IL10RA, NAMPT, MCTP1, C15orf48, SLC7A11, SIGLEC10, CDK5RAP2, EREG, TERF2IP, IL1A, ISG20, MYH11, MCOLN2, CLCF1, DDIT4, ANKRD12, AARS, SQSTM1, FLNB, NUB1, DCUN1D3, CXCL8, RILPL2, DRAM1, ATOX1, PTGS2, MAP3K4, UPB1, ADARB1, CREG1, PTPN1, RNF19B, IER3, NKG7, FAM60A, IL2RA, SLC7A1, MT1H, SAMSN1, ASCC1, FYN, MT2A, ETS1, PPP3CC, MT1A, LAT, RHBDF2, G0S2, CEP135, PANX2, C5orf15, HMGN2P46, ORM1, TRAF1, C17orf58, MB21D2, LPAR1, TRAF3IP2, TNFAIP3, SEMA4A, ARHGEF2, LMO4, TNIP1, TBC1D9, ACSL5, CYP2S1, BTG3, TNIP3, EXOG, NLRP3, SEMA6B, PSTPIP2, PTGES, MARCKSL1, CD86, NFKB1, LSS, AQP9, TANK, CCR7, MT1G, LAMB3, SLC25A37, RUNX2, ADAMDEC1, NFKBIE, SYT11, PVRL2, MLLT6, MT1F, ETS2, SLC7A5, CA12, MRPS6, GK, SLC3A2, BHLHE41, WARS, TNFAIP2, CXCL16, PILRA, CCDC115, TMEM205, HIST2H2BE, SIK3, ITGB8, PPP1R18, PTPRE, NBN, HIVEP1, GRAMD1A, KYNU, SLC1A3, NFE2L1, PCNX, CD14, CYP27B1, APBB3, FPR2, CEP350, CTTN, IRAK2, DDX59, CCM2L, PIM2, TSPAN33, ACO1, TAP1, RNF144B, CXCL5, IKBKE, EMR3, APOL3, H1F0, NADK, ZMIZ2, NFS1, HLA-F, BATF3, HIF1A, MTF1, YARS, STOM, RASGRP1, HIST2H2AC, GJB2, SLAMF1, CLEC4E, CCL5, KIAA0226L, GNA15, CFB, AMPD3, PNKD, MT1X, SMOX, IL1B, BIRC3, MAP1LC3A, ZMYND15, SLC2A6, SPECC1L, OSM, PRKCH, C1S, LAD1, PDE4B, STAT4, GPR84, TNFAIP6, C1orf122, PLAGL2, SLC43A2, HELZ2, TSC22D1, SLC5A3, CXCL1, HEY1, ABHD17C, CRISPLD2, DNAJB6, PGD, NDP, MMP9, ASNS, IRF7, ACKR3, RCN1, SLC9A1, RFTN1, EBI3, TGFA, PPA1, ADORA2A, CLEC4D, MUCL1, GPR132, RELB, FAM20A, GCH1, CTSL, NINJ1, ST3GAL1, SMAP2, MYO1B, TYMP, TNFRSF4, NCF1C, GBP5, HBEGF, CYB561A3, MT1IP, ZSWIM4, IL36G, LAMP3, MT1E, ZHX2, PFKFB3, N4BP1, MXD1, GNA12, CD38, PARP10, DTX2, LILRB2, TMEM132A, EMR2, SPHK1, SIRPA, PLAUR, VEGFA, PTPRF, C1QTNF1, STEAP3, MPZL1, CD82, CLEC4A, DUSP10, GLIS3, SOD2, ISCU	http://www.ncbi.nlm.nih.gov/pubmed/24530056

92	CD69, SPP1, CAT, LSP1, NUCB2, CRIP1, ATP1B1, DUSP23, RPSAP52, LAMP2, PAQR4, BTK, GCNT1, SULF2, ANKRD33, FCN1, H2AFY, CTSD, COL8A2, LINC00857, ADCY3, CTSG, NREP, PGAM4, PDGFC, S100A4, ITGAM, TOP2A, COLEC12, DPEP2, SCD, FGL2, CD300A, GCHFR, CD9, PYGL, FABP5, VAT1, SAP30, TREM2, ATP5C1, GPR34, JAKMIP2, ADORA2B, NRGN, PLBD1, RBPJ, NFE2, CYBRD1, PCED1B, PON2, AGRP, CEBPA, F13A1, LIPA, TSPAN32, HADH, PTPRO, MS4A6A, TLR5, GRAMD4, CD1B, NUSAP1, VEGFB, MPC2, EVL, DHRS9, CHST13, ME1, MNDA, CHCHD10, APOE, SLFN11, FUCA1, PLXDC2, MGAT4A, PLA2G15, CSTB, HHEX, MFNG, HSPD1, SCPEP1, IQGAP2, RAB7B, HLA-DPA1, PHYH, PLTP, NDUFS5, TMEM236, CFD, FABP5P3, CD36, SEPP1, CD37, LPL, APOC1, DDIAS, SIDT2, RNASE1, MGMT, C1QB, S100A10, TUBA1B, CST3, PLIN2, GPNMB, S100P, APBB1IP, CCDC109B, NTAN1, MGST2, NNT, RPL7A, NUPR1, CORO2A, CKS2, ACP5, SERINC2, AP1S2, KLF4, CAMK1, RCBTB2, CHPT1, CD52, CD68, UBE2C, GPBAR1, SLC29A1, NGFRAP1, MS4A4A, FCGR2B,	http://www.ncbi.nlm.nih.gov/pubmed/24530056
93	ZFYVE16, HNRNPDL, MCTP1, SLC7A11, Mar-03, IL1A, MCOLN2, NEK6, DDIT4, MAOA, NUB1, PHLDB1, TNS3, DRAM1, COX10, SLC20A1, VNN1, INSIG2, OCSTAMP, PTPN1, FAM60A, IL2RA, SLC7A1, ETS1, RHBDF2, G0S2, TSC22D1, EEF1B2, IDH3A, C17orf58, TRAF3IP2, PACSIN2, LMO4, TNIP1, MPO, ACSL5, CS, KLHL5, BTG3, OTUD4, PLGRKT, F5, SIAH1, NFKB1, AQP9, LAMB3, RPL32, ADAMDEC1, PFDN1, SYT11, MT1F, TNC, SLC7A5, CA12, METTL21B, MRPS6, GK, BHLHE41, WARS, EFTUD1, SRC, CCDC115, FILIP1L, ARFGAP3, ATP1A1, PTPRE, NBN, HIVEP1, GRAMD1A, KYNU, SLC1A3, NFE2L1, PCNX, CYP27B1, ANXA5, QPCT, SH3PXD2A, SERPINE1, CTTN, CLINT1, TTC13, IRAK2, SLC41A2, TSPAN33, ACO1, RNF144B, HNRNPA0, FAM213A, NFS1, MTF1, BCAT1, UCK2, SLAMF1, STRN3, GPR124, CCL5, IL1B, BIRC3, SLC50A1, SLC2A6, CLEC5A, LINC00938, PRKCH, LAD1, SLC25A3, GPR84, DENND5A, TNFAIP6, SLC35F2, CRISPLD2, PRKCDBP, DNAJB6, NDP, PLEK, MMP9, SPARC, F3, ANKRD22, SLC9A1, RFTN1, TSKU, EBI3, PPA1, ADORA2A, RGS16, MYOF, ATP5L, METTL1, TNPO1, AK4, ESYT2, SCG5, COA1, FNBP4, TNFRSF4, HBEGF, MT1H, TMEM194A, ZSWIM4, IL36G, RPS4X, ACVR1B, BCL2, FYN, DTX2, HOPX, TMEM132A, PTGES2, EMR2, SPHK1, SFXN4, BID, VEGFA, PTPRF, C1QTNF1, HSD11B1, C6orf48, CD82,	http://www.ncbi.nlm.nih.gov/pubmed/24530056

	FMNL3, MTHFD2, SOD2	
94	LSP1, NUCB2, STAB1, METTL7A, GFRA2, RBP1, LAMP2, BTK, SOD1, TGFBI, ANKRD33, FCN1, FOS, LOC440704, CTSD, LINC00857, GAPT, RGS19, TLR7, NREP, CXCL2, CPVL, PDGFC, CCNL1, TNFSF12, S100A4, COLEC12, DPEP2, HSP90B3P, CD300A, FES, GCHFR, KLHDC8B, PYGL, FABP5, ANKRD36B, LGMN, ANXA2P1, C1orf85, TREM2, GPR34, JAKMIP2, B3GNT5, CYP27A1, NRGN, TLR4, EIF2AK2, GMFG, NFE2, PCED1B, AGRP, CD68, F13A1, HLA-DRB3, LIPA, GADD45B, MAF, ZFP36, MS4A6A, TLR5, MAP3K1, NUSAP1, RNF130, S100A8, BOK, ARHGDIA, KLF6, KLF2, IFI27L2, RAB3IL1, FOLR2, PCOLCE2, ITPRIPL2, OTUD1, FUCA1, MPZL2, C1orf162, HEBP2, CLTC, PLA2G15, SLCO2B1, MAFB, SCPEP1, RAB7B, PHYH, TMEM236, CFD, FABP5P3, CEBPD, NPL, CCL13, CD36, SEPP1, CD37, FAM102B, AIF1, RNASE1, PTGER4, C1QB, BLVRB, STK17B, CST3, HMOX1, GPNMB, S100P, NAIP, CCDC109B, NTAN1, CAPZA1, LGALS3, IFI30, HMGB1, NUPR1, GRN, CORO2A, ADD3, POTEKP, HLA-DRB6, HIST1H4C, ACP5, ALDH1A1, SERINC2, KLF4, SHISA5, MAN2A1, RCBTB2, CAT, NBPF10, SLFN11, ECHDC1, HLA-A, CHPT1, CD52, SRP14, TUBA3D, LYL1, HMGB2, PRMT2, FAM89A, ITGB5, GPBAR1, RTN3, LILRB5, PON2, ILK, NGFRAP1, MS4A4A, LTB, DHRS9, TGFBR2, ARRB2, HNRNPUL1, OSBPL1A	http://www.ncbi.nlm.nih.gov/pubmed/24530056

95	SELM, CYP26A1, EHD1, IL10RA, HNRNPDL, NAMPT, SAP25, MCTP1, C15orf48, PRDM1, SLC7A11, SIGLEC10, ELL2, DUSP5, EREG, IL1A, ISG20, MCOLN2, PFKFB3, CSF2RA, DDIT4, LILRA3, IRAK3, TFDP1, SQSTM1, TFPI, BANP, VAMP4, NUB1, RAB27A, CXCL8, FCGR2A, PID1, ZC3H12A, TMEM71, VNN1, YPEL2, PTGS2, MAP3K4, RILPL2, UPB1, VNN2, ADARB1, MAMLD1, HIF1A, PTPN1, FOXO3, IER3, NKG7, ZNF281, ST3GAL1, FAM60A, IL2RA, SAMSN1, THBS1, FYN, ETS1, UIMC1, LAT, RHBDF2, G0S2, SPRY1, CEP135, GADD45A, CYTH1, PANX2, TNFRSF10B, TNFRSF21, C17orf58, SLC44A1, MB21D2, TRAF3IP2, AKR1B1, TNFAIP3, SEMA4A, CPD, ETV3, TNIP1, PTGER2, CD93, ULK1, ACSL5, CYP2S1, DMXL2, BTG3, TNIP3, LILRB1, ADAM8, IRF1, RNF145, NLRP3, SEMA6B, PTGES, MARCKSL1, CD86, NFKB1, AQP9, TANK, CCR7, MET, LAMB3, SLC25A37, ADAMDEC1, SYT11, LOR, MLLT6, MT1F, ETS2, SLC7A5, CA12, ARID5B, RYBP, MRPS6, SESTD1, GK, MS4A14, BHLHE41, CXCL16, SLC16A6, TMEM205, GPR162, CHST7, PTPRE, NBN, A4GALT, TBC1D8, HIVEP1, VMO1, GRAMD1A, KYNU, SLC1A3, TBK1, PCNX, CD14, APBB3, FPR2, CEP350, DLL1, PLSCR1, IRAK2, FJX1, BMP6, PIM2, S100A12, TSPAN33, RNF144B, CXCL5, EMR3, APOL3, ST8SIA4, RIPK2, THBD, STX1A, SRGN, ZMIZ2, MEF2D, MTF1, BCAT1, IL13RA1, HIST2H2AC, GJB2, RAPGEF1, TM4SF1, SLAMF1, CLEC4E, NFKBIA, CCL5, DNAJB9, GNA15, IL24, SMOX, IL1B, BTG1, BIRC3, MAP1LC3A, CREBRF, ZMYND15, SLC2A6, CXCL6, PELI2, OSM, PRKCH, LAD1, PDE4B, SLC16A10, RFX8, STAT4, GPR84, DENND5A, TNFAIP6, SLC43A2, RUNX3, SLC5A3, CXCL1, HEY1, ABHD17C, CRISPLD2, PDE4D, SOD2, DNAJB6, CRLF2, HIST1H2BK, SMPDL3A, PTPRF, ACKR3, RFTN1, CXCR4, PRDM8, EBI3, VEGFA, VNN3, TGFA, ADORA2A, XBP1, LAMC1, CYP3A5, GCH1, ANKDD1A, CEMIP, NINJ1, AK4, TXN, PGS1, SMAP2, IRS2, MYO1B, NUAK2, FNBP4, EPB41L3, TNFRSF4, GBP5, HBEGF, ZSWIM4, IL36G, ITGAV, LAMP3, ZHX2, ARRDC3, NSUN7, MXD1, TMCO3, PILRA, DTX2, WTAP, C9orf72, LILRB2, HOPX, TGIF1, IL7R, GPR64, KL, BTN2A1, FCAR, PLAUR	http://www.ncbi.nlm.nih.gov/pubmed/24530056

96	CD69, SPP1, ATP5D, BCL2L1, CD1C, LSP1, STAB1, METTL7A, GFRA2, MDH1, CRIP1, STMN1, DUSP23, RPSAP52, RNH1, APEX1, AP2S1, CLEC12A, UQCRQ, GCNT1, RBX1, PLD3, ANKRD33, PPT1, VSIG4, NUDT14, HK3, ALCAM, GALM, ATP5F1, QDPR, ATIC, H2AFY, CTSD, COL8A2, HSPB1, ADCY3, CTSG, NREP, PGAM4, FKBP1A, LAP3, S100A4, ITGAM, TOP2A, IFI6, LST1, CDK4, DPEP2, SCD, ITGB1BP1, HSP90AA1, SNX2, FGL2, EIF3K, PCNA, GCHFR, LY6E, CD9, PYGL, FABP5, IDH1, SLC38A6, ANXA2P1, C1orf85, PYCARD, HCST, VAT1, TREM2, ATP5C1, GPR34, JAKMIP2, AIF1, TUBB, NRGN, PLBD1, RBPJ, IFI16, GMFG, NFE2, ANXA2, PCED1B, CARD9, HSPH1, PFN1, CORO1A, PON2, AGRP, AHNAK, CEBPA, F13A1, LIPA, TSPAN32, HADH, CCL2, PTPRO, TECR, MSMO1, MS4A6A, C14orf159, CD163, SLC29A1, LGALS1, GRN, CD1B, NUSAP1, LDHB, FBP1, BOK, ATP1B1, EVL, MARCO, ID3, RGS10, DHRS9, CHST13, ARHGDIA, ME1, CALR, SH3BGRL3, PSMD14, C1QA, MNDA, CHCHD10, ACOT7, IFI27L2, APOE, NME1, RAB3IL1, TUBA1A, EGR2, A2M, CORO1C, FOLR2, S100A11, IDH2, CECR1, DHRS3, FUCA1, PLXDC2, NDUFS3, PLA2G15, ADAM15, HCFC1R1, IFI44, SEPN1, ESYT1, CSTB, HHEX, HSPD1, SCPEP1, IQGAP2, RAB7B, HLA-DPA1, PHYH, PLTP, TMEM236, CFD, ITGB7, BSG, FABP5P3, IMMT, CCL13, CD36, SEPP1, C1QC, CD37, LPL, 40787, APOC1, MFSD1, DDIAS, UQCC2, SIDT2, DCSTAMP, RNASE1, PTGER4, DNASE2, C1QB, S100A10, MCM6, ACAT1, TUBA1B, CST3, NME4, GPNMB, S100P, EMP1, APBB1IP, CCDC109B, NTAN1, MGST2, HIBADH, IFI30, SLC7A8, NUPR1, POTEKP, ACTB, ACTG1, CKS2, ACP5, GGCT, MRPL15, PGAM1, CISD1, YBX1, LRP3, CTNNAL1, KLF4, CAMK1, TMEM173, SLFN11, NDUFAB1, BANF1, COX7B, CYTL1, PPIA, CD52, LYL1, MRPL18, TSPO, KCNMA1, ITGB5, HMGA1, GPBAR1, CD1E, YIF1B, CD276, ALG8, NGFRAP1, MS4A4A, ZYX, CD74, FCGR1B, CTDSPL, OSBPL1A, LGALS9,	http://www.ncbi.nlm.nih.gov/pubmed/24530056
97	ZBTB34, SLC7A11, OAS2, IFNGR1, FAM60A, STAT2, CENPBD1, VMP1, LPAR1, TLR8, CD86, ADAMDEC1, CXCL16, PARP9, VMO1, PRKAR1A, PCNX, MKLN1, MAPK13, CFB, TRIM22, HELZ2, BCDIN3D, MOB3C, ZNF22, HCP5, CCDC117, SAMD9, ISG15, SMAP2, FNBP4, BCL2L13, MX2, PTPRE	http://www.ncbi.nlm.nih.gov/pubmed/24530056

98	ANKRD33, CTSD, CCNL1, PPIA, FABP5, ANXA2P1, SAP30, JAKMIP2, UBE2C, NFKBIZ, NUSAP1, LDHB, BOK, KLF2, DBI, CLTC, PLTP, TMEM236, CFD, FABP5P3, IMMT, 40787, MGMT, PTGER4, STK17B, HMGB1, NUPR1, POTEKP, HLA-DRB6, CKS2, RPL5, YBX1, SKAP2, KLF4, NBPF10, KANSL1, SRP14, MYADM, ILK, MS4A4A, UGP2	http://www.ncbi.nlm.nih.gov/pubmed/24530056
99	KCTD12, SOX4, NOV, LRRC17, TBX18, SCD, BDKRB2, WNT2, SLC7A14, FER1L6, CLDN11, VCAM1, ADAMTS14, CCKAR, CREB5, TNFAIP6, CRABP2, IGDCC4, TMEM35, GDF15, TSLP, ADAM12, AQP3, FST, PER3, PRSS35, PIEZO2, TNFRSF11B, RND2, CDH6, LIF, ITGA11, ADCY1, SIPA1L2, PHGDH, AMOT, HMOX1, PGBD5, CDON, MXRA5, PLA2G4A, FAM171B, CPA4, AIF1L, GPR68, HSD17B6, LHFPL2, SLC6A9, C4orf46, OLFML2A, EPHB2, GXYLT2, SLC14A1, LRRC15, ODZ4, BDKRB1, BMPER, FAM46C, MARCKS, WARS, ARHGAP28, RCAN2, TMEM119, RAP2B, CDKN2B, MEST, IFIT1, SLC39A10, EPHB3, TUBB, RPS6KA5, LDB2, TUBA1A, C14orf132, TMEM200A, NCKAP5, TUBB3, NEK10, PHLDA1, LOC148145, NYNRIN, RN5-8S1, SLC6A6, RHOJ, FLRT3, TRIM45, CIT, PDE5A, RTKN2, ARSI, G0S2, VEGFA, FAM46A, SEMA3A, JUN, SAMD12, CLIC2, SOX9, GRAMD4,	http://www.ncbi.nlm.nih.gov/pubmed/24926665
100	C7, CCDC69, DUSP1, FKBP5, GPX3, KLF15, MAOA, SAMHD1, SERPINA3, SPARCL1, RGCC, TSC22D3, CRISPLD2, PER1, ERRFI1, STEAP4, MT2A, METTL7A, IRS2, RASL11A, FGD4, INHBB, NNMT, KCNK6, GLUL, KLF9, NA, ITGA10, CORO6, ADRA1B, IMPA2, ZBTB16, FOXO1, ADAMTS5, PDK4, ENDOD1, SORT1, CACNB2, ADARB1, NEXN, NAV3, DCXR, STC1, TRNP1, IGFBP2, MAMDC2, SUN2, FSTL3, PTX3, GPRC5B, HSPA2, FAM107A, TJP2, PPP1R14A, MTSS1, CYR61, USP53, GPM6B, ADAMTS1, TRPC6, RASL11B, LMCD1, MMD, ACSL1, PKDCC, STEAP1, ACSS1, TIMP4, COL11A1, PLXNA4, MT1X, APCDD1, DNAJB4, ACTG2, GGT5, LEP, CD302, MT1E, AOX1, CEBPD, DAAM2, TEX2, TCEAL4, SAT1, PHC2, SPON1, KLF5, AFAP1L1, NKD1, PIK3R1, CDC42EP3, CTPS1, INPP5A, PRODH, FBN2, PXDC1, NID1, ALPK3, NR4A3, HPS5, PDPN, EPHB6, ATF3, OXTR, RAB11FIP1, CITED2, RAPGEF5, COL4A1, NEGR1, PRKAG2, SLC16A12, SMARCD2, NEDD9, GALNT15, MYADM, FZD8, CILP, GFPT2, AHCTF1, EOGT, SSH2, SMIM3, DLL4, C10orf10, CHST7, GCNT4, SCARA5, STON1, SLC7A6, ABLIM1, NCOA3, TGFBR2, MOB3B, COL4A4, RNF144B, FOXO3, GCLM, DAPK2,	http://www.ncbi.nlm.nih.gov/pubmed/24926665

	MAP1LC3C, COL7A1, CYTH3, FIBIN, DIO2, HIGD1A, CPM, NFIL3, RHOB, HSPB3, CD82, STARD7, WFDC1, ZCCHC5, ANXA4, RAI2, KANK1, SCN7A, ABHD5, STOM, SYNPO2, LBH, RASD1, CALCOCO2, POTEE, C1QTNF1, CADPS2, LAMA3, ZHX3, LGI3, ZCCHC6, TSPAN8, CORIN, ENPP1, GADD45B, SAMD4A, LRRC16A, DHRS3, PREB, HMGB2, MAFF, NAMPT, JADE1, ARMC8, NUAK1, ARHGAP29, DDAH1, MICAL2, ANPEP, PNPLA2, KLF6, AASS, CBS, WASF3, LMOD1, RSPO1, AP1M1, FAM43A, FAM46B, SQRDL, LINC00312, FZD5, SAP30, VGLL3, ING2, TM4SF1, DUSP5, FADS3, CTGF, RWDD4, KLHL42, STK17B, REV3L, EBF1, APBB2, HSD11B1, AXIN2, TXNRD1, ABCA6	
101	ADAMTS9, ALOX15, BCL2L15, C1QTNF1, CA2, CCBL1, CCL26, CD274, CD44, CDH26, CISH, CST1, CST2, CST4, CTSC, DPP4, FAM26E, FETUB, GGH, HS3ST1, LRRC31, NTRK1, NABP1, PCSK6, POSTN, SERPINB4, SH2D1B, SIDT1, SLC26A4, SLC39A8, SLC5A1, SOCS1, SUSD2, USP54	ADEPT cohort
102	KLRC4, CCL3L3, IL12RB2, CCL5, KLRD1, GZMA, KLRC4, GZMB, CCL4, CCR2, PLEK, SULF2, ENTPD1, ITGAX, MS4A4A, GPR55, IL21R, GRAMD3, DENND4A, PRF1, IRG1, TIGIT, CD2, SYTL2, MMP9, UGCG, CST7, CPNE7, CD28, C1orf21, SH2D2A, KLRB1, PMEPA1, CHSY1, SAMD3, SEPN1, GAS7, NCF1, HOPX, CDH1, MCTP2, SULT2B1, BCL2L11, GPR18, TRAT1, GPR174, ICAM1, PIK3R5, ADAMTS14, ZDHHC15, PADI2, GPC1, SEMA6D, SATB1, ITM2A, KDM2B, LYST, GLP1R, LRRC8D, EOMES, SELL, BAIAP3, BAIAP2	http://www.ncbi.nlm.nih.gov/pubmed/25621825
103	CCR8, CCR4, IL5, KLRG1, IL17RB, HS3ST1, IL1RL1, IL13, SLC7A8, CD27, NEB, RXRG, CALCA, IL6, IL4, PTPN13, PDCD1, NPNT, HLA-DOA, HES1, LPCAT2, IL9R, PPARG, TPH1, STXBP6, CYBB, BMP7, INPP4B, CCL1, BMP2, AR, MC5R, ATP8A2, PPP2R3A, KCNN4, DGAT2, NMUR1, KCNQ5, RAB27B, LRRC52, ALOX5, PTGIR, ZC3H12C, TGM2, IL10RA, ACER2, HBA2, GATA3, CHDH, NCK2, BZW2, NAIP, MRAS, C19orf38, HBA2, TSPAN13, AREG, EBI3, KLF5, PLAUR, ADAM19, IRF4, EEPD1, PDLIM1, NCKAP5, TANC2, SERPINE1, FBXL21, UBE2E2, RNF128, IPMK, CA13, MED12L, CXorf57, PARD3, CHD7, PDE7B, PCSK1, MAP4K3, LGMN, TAF1D, RPS19, CACNA1D, SPCS3, ST6GALNAC5, RPLP1, NFKB1, GALNT3, CXCL1, NAIP, SNORA45A, LPHN2, DHX40, STAB2, PLK2, GLB1, PTPN9, RAB4A, NFIX, BAMBI, UBE2L6,	http://www.ncbi.nlm.nih.gov/pubmed/25621825

	NAV2, ACBD7, SNORD8, FAM71F2, APBB2, MBOAT1, C9orf72, ARL5C, RUNX1T1, HLF, CSF2, EMP3, HOMER2, CYP51A1, SPRY1, GRIN2D, CYP2D7, FOXP3, UNC5B, SPECC1, DUSP10, C21orf62, KRT80, KLF4,	
104	GSTM3, UPP1, EPS8L3, IL1R2, CXorf23, F2RL2, CAPG, FAH, DUSP4, GDA, NMBR, CCNE2, GJB2, RYK, TMTC2, DPEP2, B3GALT2	http://www.ncbi.nlm.nih.gov/pubmed/25621825
105	CXCR5, IL1R1, STOM, PTGES, CNTN1, NRP1, VIPR2, HMGN3, CTSH, CCR6, APOBEC1, CD2AP, MAPK10, P2RY1, GUCY1A3, IGFBP4, LINGO4, DLL1, TIFA, PTGER2, SDC4, HS6ST2, IGF1R, CX3CL1, IL17RE, GRIA3, GALM, NPL, SDC2, KIAA1598, ATRNL1, PPAP2B, SNORD14C, SLC6A13, CACNA1G, DNAJC6, ERMP1, RNASE6, OR4C12, PDE6D, PDGFRB, DDC, NAPEPLD, EEF2K, TUBA8, ADK, FAM184B, TRAPPC2, TOX2, HELLS, SLC41A3, KHDRBS3, BATF3, ALG14, MSRB3, FLRT2, TTYH2, SDC1, LTB, DSG2, TMEM60, CITED4, LDHB, SLC6A7, ACTR6, ACAT1, HLA-DQA1, ABCA3, SRR, IRGM, HK3, DNAJB1, GOLPH3L, HTRA2, PARVB, TM9SF2, FERMT2, PLB1, CDC14A, ABHD15, DENND3, MED21, TMEM70, RHOB, FANCL, PMPCB, GDPD5, DSCAM, TMEM229B, P2RX1, APOA1, EID1, LSM10, ZNF43, TMEM126B, ABCA1,	http://www.ncbi.nlm.nih.gov/pubmed/25621825

179 Appendix: **The members of the U-BIOPRED Study Group are as follows:**

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