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Title

Systemic Immunological Consequences of Chronic Periodontitis

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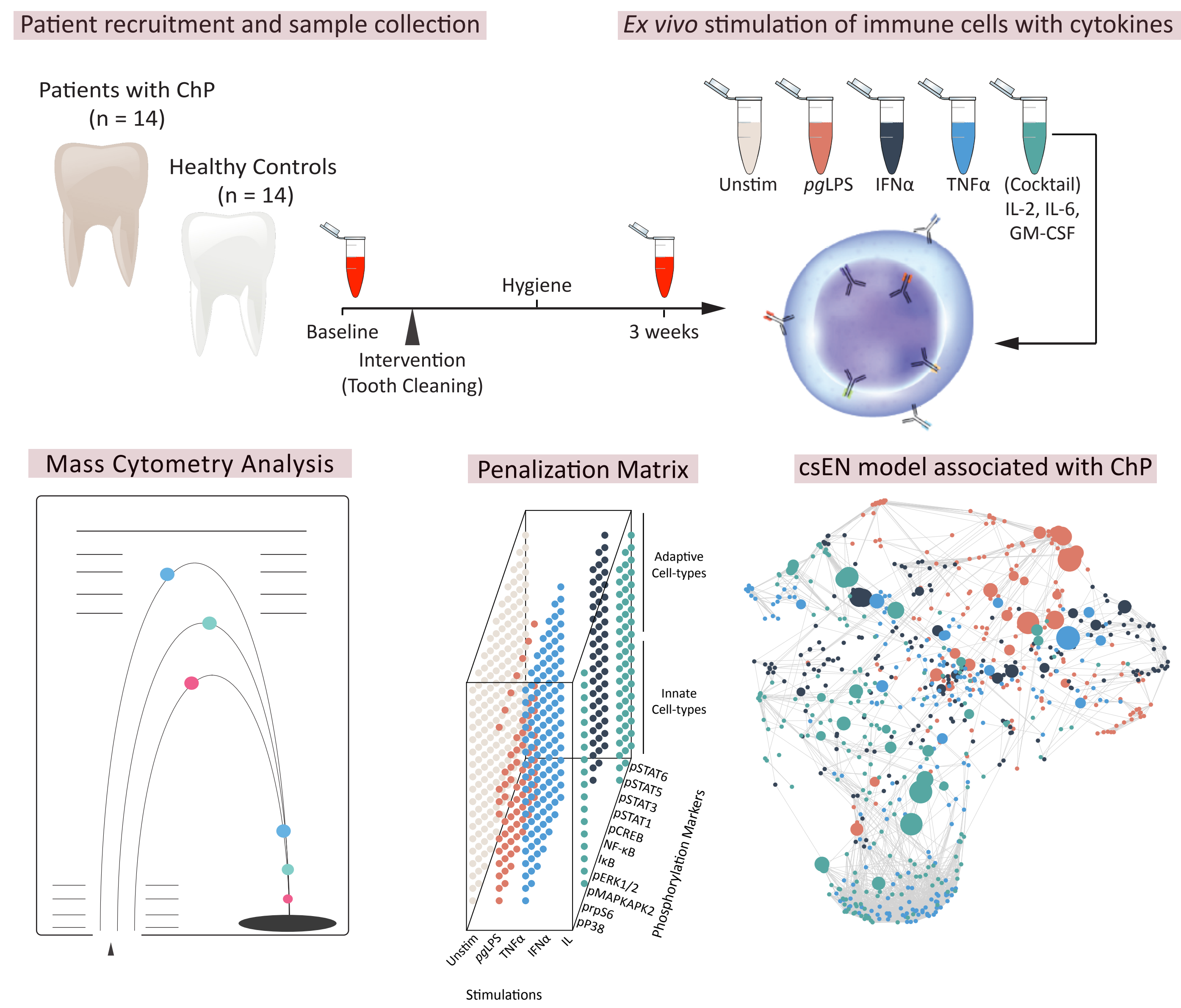


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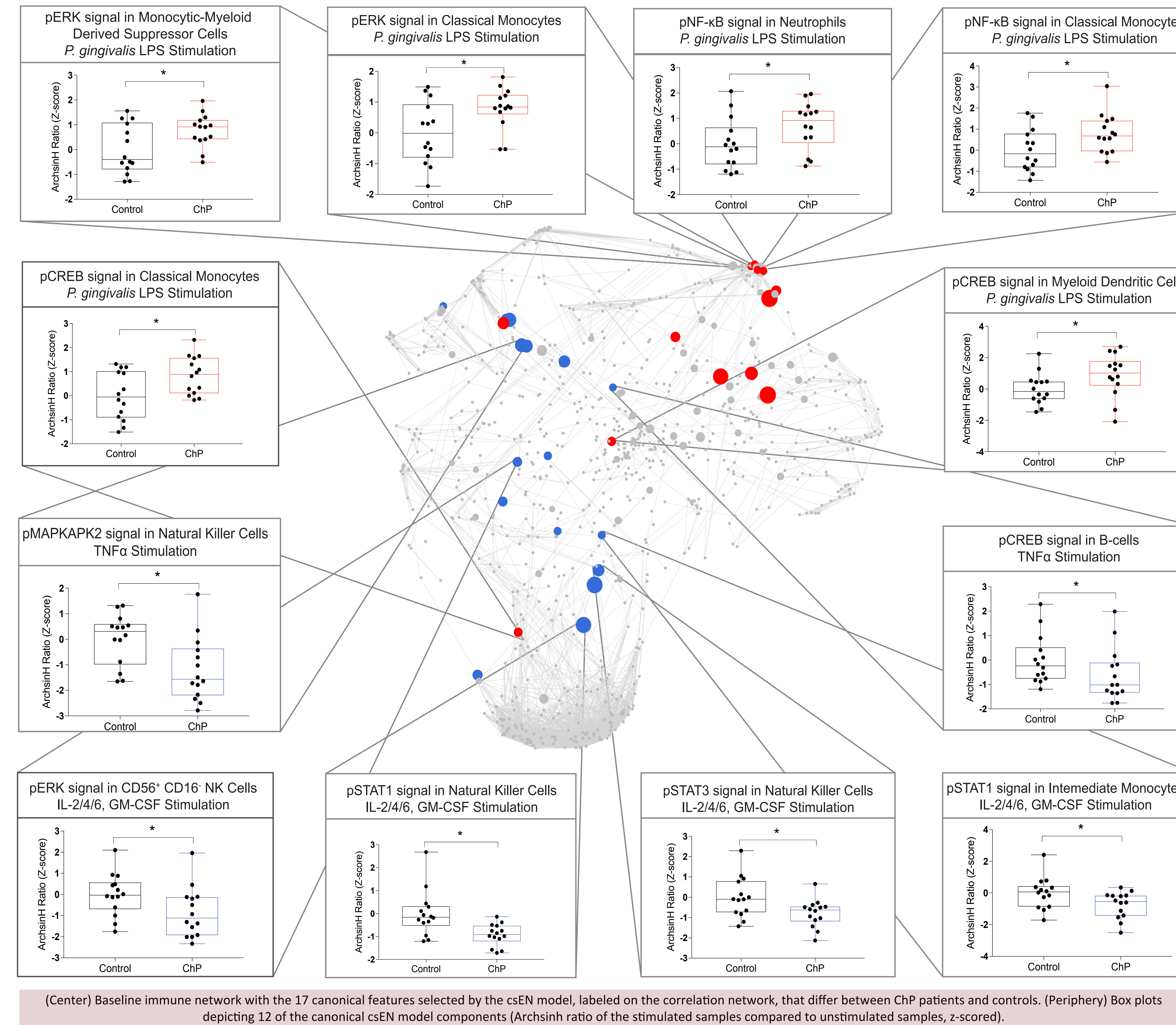
ABSTRACT

Chronic Periodontitis (ChP) is a prevalent inflammatory disease affecting 46% of the US population. ChP produces a profound local inflammatory response to dysbiotic oral microbiota that leads to destruction of alveolar bone and tooth loss. ChP is also associated with systemic illnesses including cardiovascular diseases, malignancies, and adverse pregnancy outcomes. However, the mechanisms underlying these adverse health outcomes are poorly understood. We used a highly multiplex mass cytometry immunoassay to perform an in-depth analysis of the systemic consequences of ChP in patients, before and after periodontal treatment in this prospective cohort study. A high-dimensional analysis of intracellular signaling networks revealed immune system-wide dysfunctions differentiating patients with ChP from healthy controls. Notably, we observed exaggerated pro-inflammatory responses to *P. gingivalis*-derived lipopolysaccharide in circulating neutrophils and monocytes from patients with ChP. Simultaneously, natural killer cell responses to inflammatory cytokines were attenuated. Importantly, the immune alterations associated with ChP were no longer detectable three weeks after periodontal treatment. Our findings demarcate systemic and cell-specific immune dysfunctions in patients with ChP which can be temporarily reversed by the local treatment of ChP.

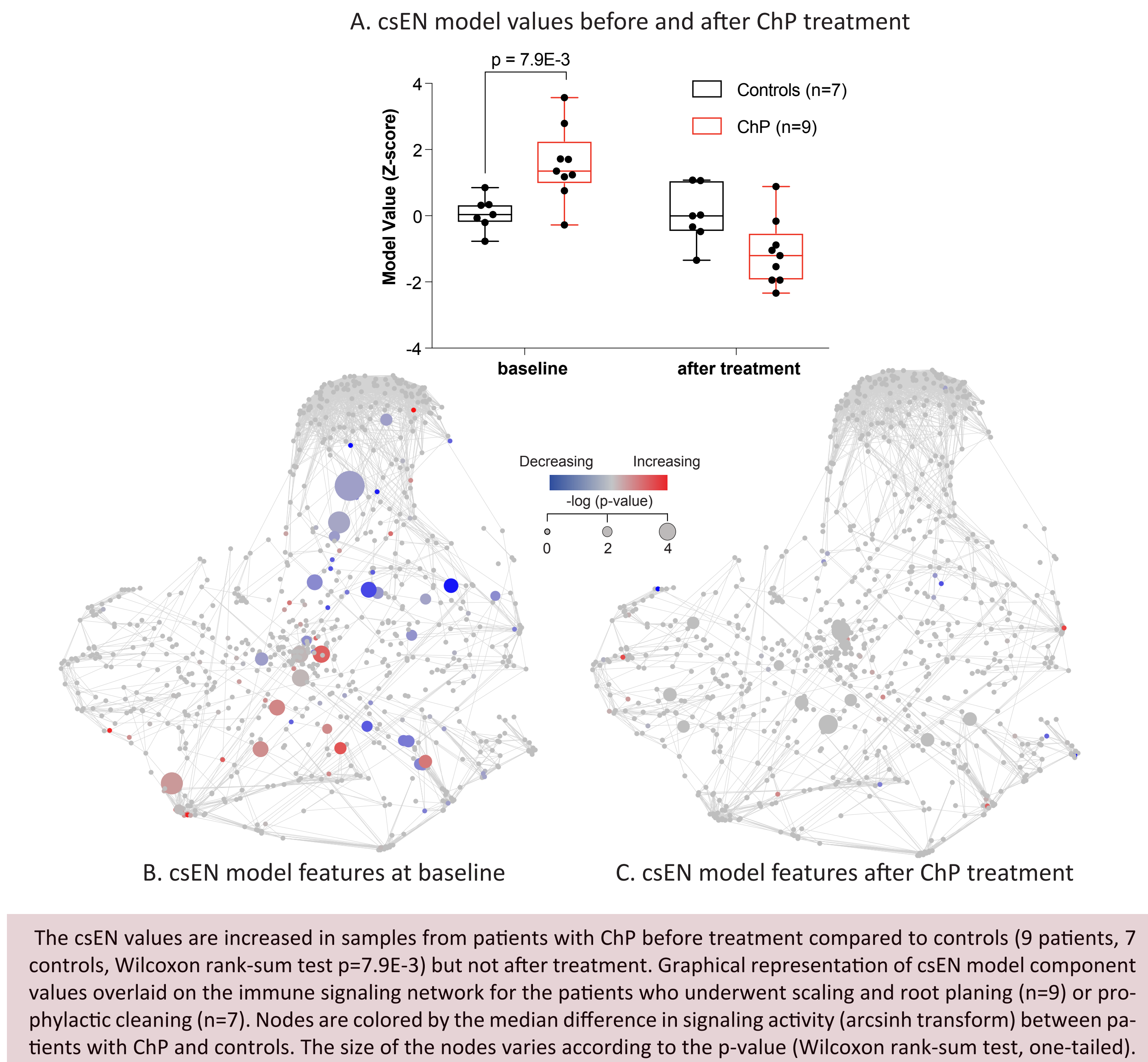
STUDY DESIGN



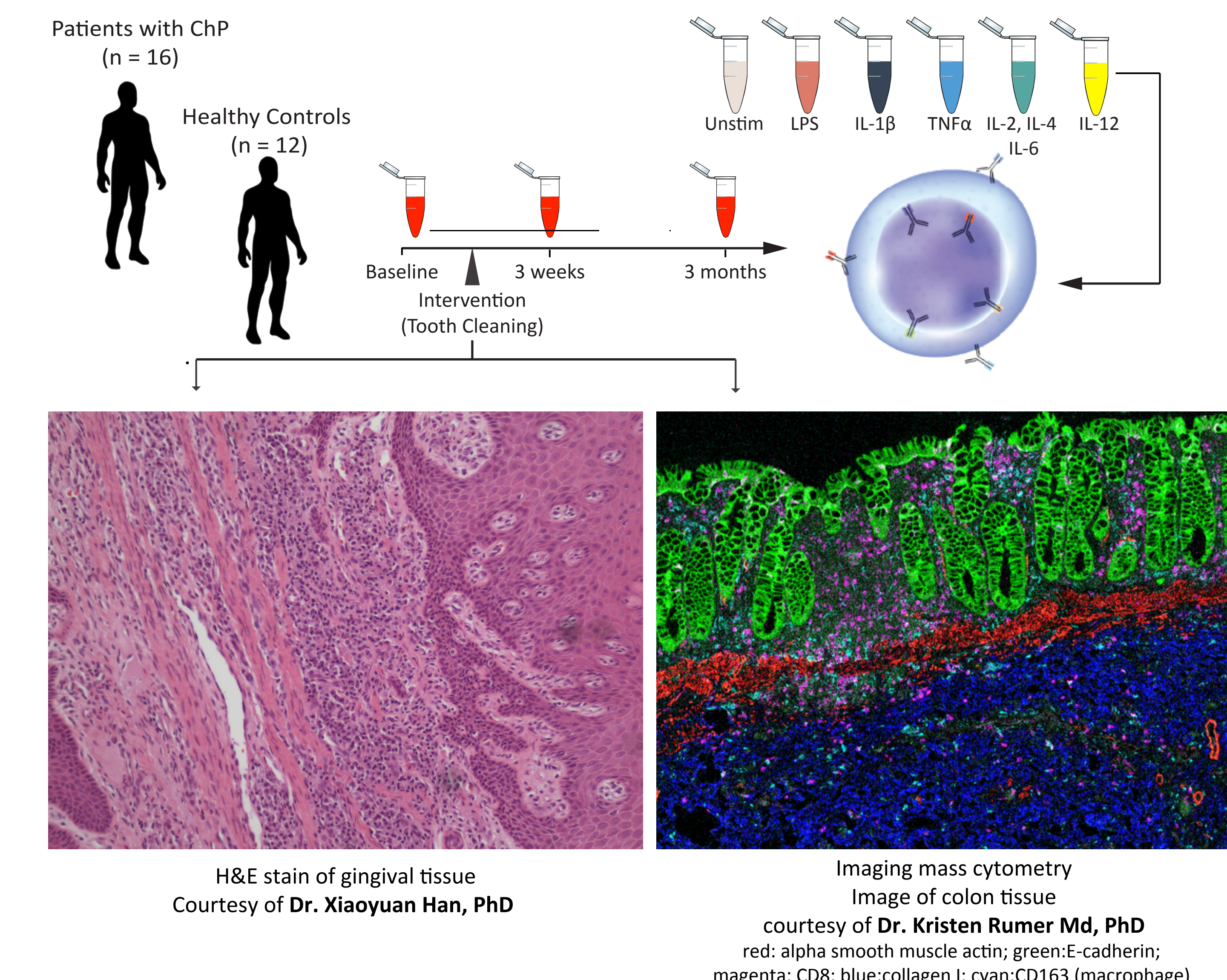
csEN model identifies systemic immune alterations associated with ChP



RESULTS



PHASE II



Demographic	Metric	Patients with ChP (14)	Healthy Controls (14)	Test
Age	Median (Range)	40.5 (29-61)	36.5 (26-57)	t-test p = 0.12
Sex	Male (n) Female (n)	6 8	6 8	chi-square p = 1.00
Race/Ethnicity n (%)	African American Asian Caucasian Latino	2 (14%) 3 (21%) 0 (0%) 9 (64%)	2 (14%) 6 (43%) 3 (21%) 3 (21%)	chi-square p = 0.072
Body Mass Index	Mean (Range)	28.9 (19-40)	24.6 (19-31)	t-test p = 0.07
Comorbidities	Anemia Hypertension Morphea Thyroid Disease	1 1 0 1	0 0 1 0	

Clinical Feature	Metric	Patients with ChP (14)
Periodontal Classification	Stage III (n) Stage IV (n)	10 4
Deepest Periodontal Pocket (mm)	Mean (SD)	7.60 (1.12)
Largest Clinical Attachment Loss (mm)	Mean (SD)	8.42 (1.73)
Number of pockets \geq 5mm	Median (Range)	36 (7-84)
Number of teeth with furcation involvement	Median (Range)	0 (0-2)
Number of sites with radiographic calculus	Median (Range)	8 (2-27)