CLAIMS

1. An antibody or an antigen-binding fragment thereof that selectively binds to an epitope within the core region of transglutaminase type 2 (TG2) and that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds.

2. The antibody of Claim 1, wherein the core region consists of amino acids 143 to 473 of human TG2.

3. The antibody of Claim 1 or 2, wherein the antibody or antigen-binding fragment thereof selectively binds in whole or in part to a region comprising:

i) amino acids 304 to 326 of human TG2; or

ii) amino acids 351 to 365 of human TG2; or

iii) amino acids 450 to 467 of human TG2.

4. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises one or more of the following amino acid sequences, or one or more amino acid sequence having at least 90% identity with one or more of the following amino acid sequences:

KASQDINSYLT or TCKASQDINSYLTWF or TCKASQDINSYLTWY; and/or

RTNRLFD or TLIYRTNRLFDGVP or TLIYRTNRLFDGVPXXFSGSGSGQDFF or LLIYRTNRLFDGVP or SLIYRTNRLFDGVP or LLIYRTNRLFDGVPXXFSGSGSGQDFF or SLIYRTNRLFDGVPXXFSGSGSGQDFF or LTNRLMD or LVNRLVD or XXNRLXD or LLIYRTNRLFDGVPSRFSGSGSGTDFF or SLIYRTNRLFDGVPSRFSGSGSGTDFF or SLIYLTNRLMDGVPSRFSGSGSGTDFF or TLIYLTNRLMDGVPSRFSGSGSGQEFL or SLIYLVNRLVDGVPSRFSGSGSGTDFF or ILIYLVNRLVDGVPSRFSGSGSGQDYA or TLIYLTNRLMDGVP or SLIYLTNRLMDGVP or SLIYLVNRLVDGVP or LVNRLVD or ILIYLVNRLVDGVP; and/or

LQYDDFPYT or YCLQYDDFPYTFG or LQYVDFPYT or LQYVDFPYT or LQYXDFPYT or YCLQYVDFPYTFG; and/or

SSAMS or FTLSSSAMSWVR or CXAXXFTLSSSAMSWVR or FTFSSSAMSWVR or CXAXXFTFSSSAMSWVR or THAMS or XXAMS or CAASGFTFSSSAMSWVR

or CAASGIIFSSSAMSWVR or IIFSSSAMSWVR or CAASGFTFSTHAMSWVR or FTFSTHAMSWVR or CAASGFTLSTHAMSWVR or FTLSTHAMSWVR; and/or TISVGGGKTYYPDSVKG or WVATISVGGGKTYYPDSVKGRFTISR or WVATISVGGGKTYYPDSVKGRFTISRXNXXXXL or WVSTISVGGGKTYYPDSVKGRFTISR or WVSTISVGGGKTYYPDSVKGRFTISRXNXXXXL or TISSGGRSTYYPDSVKG or TISSGGRSTYYPDSVKG or TISXGGXXTYYPDSVKG or WVSTISVGGGKTYYPDSVKGRFTISRDNSKNTL or WVSTISVGGGKTYYPDSVKGRFTISRDN or WVSTISSGGRSTYYPDSVKGRFTISRDNSKNTL or WVSTISSGGRSTYYPDSVKGRFTISRDN or WVSTISSGGRSTYYPDSVKGRFTISR or WVATISSGGRSTYYPDSVKGRFTVSRDSSKNTL or WVATISSGGRSTYYPDSVKGRFTVSRDS or WVATISSGGRSTYYPDSVKGRFTVSR or WVATISSGGRSTYYPDSVKGRFTISRDNSKNTL or WVATISSGGRSTYYPDSVKGRFTISRDN or WVATISSGGRSTYYPDSVKGRFTISR; and/or LISLY or YCAKLISLYWG or LISPY or LISTY or LISXY or YCAKLISPYWG or YCAKLISTYWG or FCARLISTYWG,
wherein X is any amino acid.

5. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof has

at least one light chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(K/Q/R)ASQ(D/G)I(N/S/R)(S/N)YL(T/N/A), for example KASQDINSYLT; and

(R/L/V/D/A)(T/V/A)(N/S)(R/N)L(F/M/V/E/Q)(D/T/S), for example RTNRLFD; and

(L/Q)Q(Y/H)(D/V/N)(D/T)(F/Y)P(Y/L/W)T, for example LQYDDFPYT; and/or

at least one heavy chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(S/T)(S/H/Y)AMS, for example SSAMS; and

(T/A)IS(V/S/G)(G/S)G(G/R)(K/S)TYY(P/A)DSVKG, for example TISVGGGKTYYPDSVKG; and
(L/D)(I/G)(S/G)(L/P/T/V)Y, for example LISLY.

6. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises the following amino acid sequences, or amino acid sequences having at least 90% identity with the following amino acid sequences:

(a) KASQDINSYLT (LCDR1);
LVNRLVD (LCDR2);
LQYDDFPYT (LCDR3);
THAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISTY (HCDR3); or

(b) KASQDINSYLT (LCDR1);
LTNRLMD (LCDR2);
LQYVDFPYT (LCDR3);
SSAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISPY (HCDR3); or

(c) KASQDINSYLT (LCDR1);
RTNRLFD (LCDR2);
LQYDDFPYT (LCDR3);
SSAMS (HCDR1);
TISVGGGKTYYPDSVKG (HCDR2); and
LISLY (HCDR3).

7. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof has at least one light chain variable region comprising the amino acid sequence
DIKMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPS RFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or
DIQMTQTPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPS RFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or

EIVLTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPSR
FSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK), or
DIQMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPS
RFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK1), or
EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDGVPSR
FSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK (hAB-1_RKE), or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK (hAB-1_RKJ), or
AIKMTQSPSSMYASLGERVIITCKASQDINSYLTWFQQKPGKSPKTLIYLTNRLMDGVPSR
FSGSGSGQEFLLTISGLEHEDMGIYYCLQYVDFPYTFGGGTKLEIK (BB-7 VK), or
DITMTQSPSSIYASLGERVTITCKASQDINSYLTWFQQKPGKSPKILIYLVNRLVDGVPSRF
SGSGSGQDYALTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (DC-1 VK), or
QIVLTQSPAIMSASPGEKVTMTCSASSSVDYMYWYQQKPGSSPRLLIYDTSNLASGVPV
RFSGSGSGTSYSLTISRMGAEDAATYYCQQWNSSPLTFGAGTKLELK (DD-9 VK), or
QIVLTQSPAIMSASPGEKVTMTCSASSSVSYMYWYQQKPGSSPRLLIYDTSNLASGVPV
RFSGSGSGTSYSLTISRMEAEDAATFYCQQWSSSPLTFGAGTKLELK (DH-2 VK), or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLTNRLMDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or
DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMDGVPS
RFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLVNRLVDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, or
DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDGVPSR
FSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK; and/or at least one
heavy chain variable region comprising the amino acid sequence
EVQLVESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGGGKT
YYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTTLTVSS, or
EVQLEESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGGGKT
YYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTTLTVSS, or
EVQLQESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGGGKT
YYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTTLTVSS (AB-
1_VH), or
EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGGGKT
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLVTVSS
(hAB-1_RHA), or
AVQLVESGGGLVKPGGSLKLSCAASGIIFSSSAMSWVRQTPEKRLEWVATISSGGRSTY
YPDSVKGRFTVSRDSAKNTLYLQMDSLRSEDTAIYYCAKLISPYWGQGTTLTVSS (BB-7

VH), or
EVQLVESGGGLVKPGGSLKLSCAASGFTLSTHAMSWVRQTPEKRLEWVATISSGGRST
YYPDSVKGRFTISRDNVKNTLYLQLSSLRSEDTAVYFCARLISTYWGQGTTLTVSS (DC-1
VH), or
QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQSSGKGLEWLAHIYWDDDK
RYNPSLKSRITISKDSSSNQVFLKITSVDTADTATYYCARSWTTAPFAFWGQGTLVTVSA
(DD-9 VH), or
QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQPSGKGLEWLAHIYWDDDK
RYNPSLKSRLTISKDTSSNQVFLKITSVDTADTATYYCARSGTTAPFAYWGQGTLVTVSA
(DH-2 VH), or
EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVTVSS, or
EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGRSTY
YPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVTVSS, or
EVQLLESGGGLVQPGGSLRLSCAASGFTFSTHAMSWVRQAPGKGLEWVSTISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISTYWGQGTLVTVSS, or
EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLVTVSS, or
an amino acid sequence having at least 90% identity with one or more of the amino acid
sequences specified above.

8. The antibody of any preceding claim, wherein the antibody or fragment thereof has:

(a) a light chain variable region comprising the sequence
DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDGVPSR
FSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, and a heavy chain
variable region comprising the sequence
EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLVTVSS,
or amino acid sequences having at least 90% identity therewith; or

(b) a light chain variable region comprising the sequence
DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMDGVPS
RFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, and a heavy chain
variable region comprising the sequence

EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGRSTY
YPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVTVSS,
or amino acid sequences having at least 90% identity therewith; or

(c) a light chain variable region comprising the sequence
EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDGVPSR
FSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK, or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK,
and a heavy chain variable region comprising the sequence
EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGGGKT
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLVTVSS,
or amino acid sequences having at least 90% identity therewith.

9. An antibody or antigen-binding fragment thereof that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds, that antibody or antigen-binding fragment comprising one or more of the following amino acid sequences, or one or more amino acid sequence having at least 90% identity with one or more of the following amino acid sequences:

KASQDINSYLT or TCKASQDINSYLTWF or TCKASQDINSYLTWY; and/or
RTNRLFD or TLIYRTNRLFDGVP or TLIYRTNRLFDGVPXXFSGSGSGQDFF or
LLIYRTNRLFDGVP or SLIYRTNRLFDGVP or
LLIYRTNRLFDGVPXXFSGSGSGQDFF or
SLIYRTNRLFDGVPXXFSGSGSGQDFF or LTNRLMD or LVNRLVD or XXNRLXD
or LLIYRTNRLFDGVPSRFSGSGSGTDFF or
SLIYRTNRLFDGVPSRFSGSGSGTDFF or
SLIYLTNRLMDGVPSRFSGSGSGTDFF or
TLIYLTNRLMDGVPSRFSGSGSGQEFL or
SLIYLVNRLVDGVPSRFSGSGSGTDFF or
ILIYLVNRLVDGVPSRFSGSGSGQDYA or TLIYLTNRLMDGVP or
SLIYLTNRLMDGVP or SLIYLVNRLVDGVP or LVNRLVD or ILIYLVNRLVDGVP;
and/or
LQYDDFPYT or YCLQYDDFPYTFG or LQYVDFPYT or LQYVDFPYT or
LQYXDFPYT or YCLQYVDFPYTFG; and/or
SSAMS or FTLSSSAMSWVR or CXAXXFTLSSSAMSWVR or FTFSSSAMSWVR
or CXAXXFTFSSSAMSWVR or THAMS or XXAMS or CAASGFTFSSSAMSWVR

or CAASGIIFSSSAMSWVR or IIFSSSAMSWVR or CAASGFTFSTHAMSWVR or FTFSTHAMSWVR or CAASGFTLSTHAMSWVR or FTLSTHAMSWVR; and/or TISVGGGKTYYPDSVKG or WVATISVGGGKTYYPDSVKGRFTISR or WVATISVGGGKTYYPDSVKGRFTISRXNXXXXL or WVSTISVGGGKTYYPDSVKGRFTISR or WVSTISVGGGKTYYPDSVKGRFTISRXNXXXXL or TISSGGRSTYYPDSVKG or TISSGGRSTYYPDSVKG or TISXGGXXTYYPDSVKG or WVSTISVGGGKTYYPDSVKGRFTISRDNSKNTL or WVSTISVGGGKTYYPDSVKGRFTISRDN or WVSTISSGGRSTYYPDSVKGRFTISRDNSKNTL or WVSTISSGGRSTYYPDSVKGRFTISRDN or WVSTISSGGRSTYYPDSVKGRFTISR or WVATISSGGRSTYYPDSVKGRFTVSRDSSKNTL or WVATISSGGRSTYYPDSVKGRFTVSRDS or WVATISSGGRSTYYPDSVKGRFTVSR or WVATISSGGRSTYYPDSVKGRFTISRDNSKNTL or WVATISSGGRSTYYPDSVKGRFTISRDN or WVATISSGGRSTYYPDSVKGRFTISR; and/or LISLY or YCAKLISLYWG or LISPY or LISTY or LISXY or YCAKLISPYWG or YCAKLISTYWG or FCARLISTYWG,

wherein X is any amino acid.

10. The antibody or antigen-binding fragment of Claim 9, wherein the antibody or antigen-binding fragment thereof has

at least one light chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(K/Q)ASQDI(N/S)(S/N)YL(T/N), for example KASQDINSYLT; and

(R/L/V/D)(T/V/A)(N/S)(R/N)L(F/M/V/E)(D/T), for example RTNRLFD; and

(L/Q)QY(D/V/N)(D/T)(F/Y)P(Y/L)T, for example LQYDDFPYT; and/or

at least one heavy chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(S/T)(S/H/Y)AMS, for example SSAMS; and

(T/A)IS(V/S/G)(G/S)G(G/R)(K/S)TYY(P/A)DSVKG, for example TISVGGGKTYYPDSVKG; and

(L/D)(I/G)(S/G)(L/P/T/V)Y, for example LISLY.

11. The antibody of claim 9 or 10, wherein the antibody or antigen-binding fragment thereof comprises the following amino acid sequences, or amino acid sequences having at least 90% identity with the following amino acid sequences:

(b) KASQDINSYLT (LCDR1);
LVNRLVD (LCDR2);
LQYDDFPYT (LCDR3);
THAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISTY (HCDR3); or

(b) KASQDINSYLT (LCDR1);
LTNRLMD (LCDR2);
LQYVDFPYT (LCDR3);
SSAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISPY (HCDR3); or

(d) KASQDINSYLT (LCDR1);
RTNRLFD (LCDR2);
LQYDDFPYT (LCDR3);
SSAMS (HCDR1);
TISVGGGKTYYPDSVKG (HCDR2); and
LISLY (HCDR3).

12. The antibody or antigen-binding fragment of Claim 9, 10 or 11, wherein the antibody or antigen-binding fragment thereof has at least one light chain variable region comprising the amino acid sequence
DIKMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPS
RFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or
DIQMTQTPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPS
RFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or
EIVLTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPSR
FSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK), or
DIQMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDGVPS
RFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK1), or

EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDGVPSR
FSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK (hAB-1_RKE), or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK (hAB-1_RKJ), or
AIKMTQSPSSMYASLGERVIITCKASQDINSYLTWFQQKPGKSPKTLIYLTNRLMDGVPSR
FSGSGSGQEFLLTISGLEHEDMGIYYCLQYVDFPYTFGGGTKLEIK (BB-7 VK), or
DITMTQSPSSIYASLGERVTITCKASQDINSYLTWFQQKPGKSPKILIYLVNRLVDGVPSRF
SGSGSGQDYALTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (DC-1 VK), or
QIVLTQSPAIMSASPGEKVTMTCSASSSVDYMYWYQQKPGSSPRLLIYDTSNLASGVPV
RFSGSGSGTSYSLTISRMGAEDAATYYCQQWNSSPLTFGAGTKLELK (DD-9 VK), or
QIVLTQSPAIMSASPGEKVTMTCSASSSVSYMYWYQQKPGSSPRLLIYDTSNLASGVPV
RFSGSGSGTSYSLTISRMEAEDAATFYCQQWSSSPLTFGAGTKLELK (DH-2 VK), or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLTNRLMDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or
DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMDGVPS
RFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLVNRLVDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, or
DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDGVPSR
FSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK; and/or at least one
heavy chain variable region comprising the amino acid sequence
EVQLVESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGGGKT
YYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTTLTVSS, or
EVQLEESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGGGKT
YYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTTLTVSS, or
EVQLQESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGGGKT
YYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTTLTVSS (AB-
1_VH), or
EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGGGKT
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLVTVSS
(hAB-1_RHA), or
AVQLVESGGGLVKPGGSLKLSCAASGIIFSSSAMSWVRQTPEKRLEWVATISSGGRSTY
YPDSVKGRFTVSRDSAKNTLYLQMDSLRSEDTAIYYCAKLISPYWGQGTTLTVSS (BB-7
VH), or
EVQLVESGGGLVKPGGSLKLSCAASGFTLSTHAMSWVRQTPEKRLEWVATISSGGRST
YYPDSVKGRFTISRDNVKNTLYLQLSSLRSEDTAVYFCARLISTYWGQGTTLTVSS (DC-1
VH), or

QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQSSGKGLEWLAHIYWDDDK
RYNPSLKSRITISKDSSSNQVFLKITSVDTADTATYYCARSWTTAPFAFWGQGTLVTVSA
(DD-9 VH), or
QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQPSGKGLEWLAHIYWDDDK
RYNPSLKSRLTISKDTSSNQVFLKITSVDTADTATYYCARSGTTAPFAYWGQGTLVTVSA
(DH-2 VH), or
EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVTVSS, or
EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGRSTY
YPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVTVSS, or
EVQLLESGGGLVQPGGSLRLSCAASGFTFSTHAMSWVRQAPGKGLEWVSTISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISTYWGQGTLVTVSS, or
EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLVTVSS, or
an amino acid sequence having at least 90% identity with one or more of the amino acid sequences specified above.

13. The antibody of any one of claims 9 to 12, wherein the antibody or fragment thereof has:

(a) a light chain variable region comprising the sequence
DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDGVPSR
FSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence
EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGGRST
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLVTVSS,
or amino acid sequences having at least 90% identity therewith; or

(b) a light chain variable region comprising the sequence
DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMDGVPS
RFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence
EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGRSTY
YPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVTVSS,
or amino acid sequences having at least 90% identity therewith; or

(c) a light chain variable region comprising the sequence

EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDGVPSR
FSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK, or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFDGVPS
RFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK,
and a heavy chain variable region comprising the sequence
EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGGGKT
YYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLVTVSS,
or amino acid sequences having at least 90% identity therewith.

14. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises or consists of an intact antibody.

15. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises or consists of an antigen-binding fragment selected from the group consisting of: an Fv fragment, for example a single chain Fv fragment or a disulphide-bonded Fv fragment; an Fab fragment; and an Fab-like fragment, for example an Fab' fragment or an $F(ab)_2$ fragment.

16. The antibody of any preceding claim, which is an IgG1, IgG2, IgG3 or IgG4.

17. A polynucleotide encoding an antibody or an antigen-binding fragment thereof according to any of Claims 9 to 16.

18. An antibody according to any of Claims 1 to 16, wherein the antibody or antigen-binding fragment thereof does not inhibit TG1, TG3, TG13 and/or TG7 activity.

19. An antibody or antigen-binding fragment thereof whose binding to TG2, for example human TG2, is inhibited or reduced when an antibody according to any of Claims 1 to 16, 18 is bound to TG2, for example human TG2.

20. A compound comprising an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, 18 or 19 and a further moiety, for example a readily detectable moiety, and/or a directly or indirectly cytotoxic moiety.

21. A pharmaceutical composition/formulation comprising an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a

polynucleotide according to Claim 17, or a compound according to Claim 20, in admixture with a pharmaceutically acceptable excipient, adjuvant, diluent or carrier.

22. The pharmaceutical composition/formulation according to Claim 21 further comprising one or more further active ingredients.

23. The pharmaceutical composition/formulation according to Claim 21 or 22, wherein the composition/formulation is formulated for intravenous, intramuscular, or subcutaneous delivery to a patient.

24. A kit of parts comprising an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20; and a further agent.

25. An antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, for use in medicine.

26. Use of an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, in the manufacture of a medicament for reducing or inhibiting TG2 enzyme activity in an individual in need thereof.

27. Use of an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, in the manufacture of a medicament for treating and/or diagnosing Celiac disease, abnormal wound healing, scarring, scleroderma, keloids and hypertrophic scars, ocular scarring, inflammatory bowel disease, macular degeneration, Grave's opthalmopathy, drug-induced ergotism, psoriasis, fibrosis-related diseases (e.g. liver fibrosis, pulmonary fibrosis such as interstitial lung disease and fibrotic lung disease, cardiac fibrosis, skin fibrosis, myelofibrosis, kidney fibrosis such as glomerulosclerosis and tubulointerstitial fibrosis), atherosclerosis, restenosis, inflammatory diseases, autoimmune diseases, neurodegenerative/neurological diseases (e.g. Huntington's Disease, Alzheimer's disease, Parkinson's disease, polyglutamine disease, spinobulbar muscular atrophy, dentatorubral-pallidoluysian atrophy, spinocerebellar ataxias 1, 2, 3, 6, 7 and 12, rubropallidal atrophy, spinocerebellar palsy), and/or cancer (e.g. glioblastomas such as glioblastoma in Li-Fraumeni syndrome and sporadic glioblastoma, malignant

melanomas, pancreatic ductal adenocarcinomas, myeloid leukemia, acute myelogenous leukemia, myelodysplastic syndrome, myeloproliferative syndrome, gynaecological cancer, Kaposi's sarcoma, Hansen's disease, collagenous colitis).

28. An *in vitro* method of reducing or inhibiting TG2 enzyme activity, the method comprising administering an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, to a sample comprising TG2, for example a tissue or cell sample comprising TG2.

29. A method of producing an antibody or antigen-binding fragment thereof according to any of Claims 9 to 16, or 18 to 19, or a compound according to Claim 20, the method comprising expressing a polynucleotide according to Claim 17.

30. A method of selecting an antibody or antigen-binding fragment thereof that selectively binds a transglutaminase protein and that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds, the method comprising the step of selecting an antibody or antigen-binding fragment thereof that selectively binds a polypeptide comprising a transglutaminase core region/catalytic domain but not comprising a transglutaminase barrel or sandwich domain.

31. A method of producing an antibody or antigen-binding fragment thereof that selectively binds a transglutaminase protein and that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds, the method comprising administering to a non-human animal a compound comprising:

i) a polypeptide comprising a transglutaminase core region/catalytic domain but not comprising a transglutaminase barrel or sandwich domain, or a fragment thereof; and, optionally,

ii) an adjuvant.

32. A method of producing an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 comprising the step of selecting an antibody or antigen-binding fragment thereof that selectively binds a polypeptide sequence consisting of the polypeptide sequence of amino acids 143 to 473 of human TG2 or a fragment thereof.

33. A method of producing an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 comprising administering to a non-human animal a compound comprising:

i) a polypeptide sequence consisting of the polypeptide sequence of amino acids 143 to 473 of human TG2 or a fragment thereof; and optionally,

ii) an adjuvant.

34. The method of Claim 31or 33 further comprising the step of selecting an antibody or antigen-binding fragment thereof that selectively binds a transglutaminase protein, for example a TG2 such as human TG2.

35. An antibody or antigen-binding fragment thereof obtainable by the method of any of Claims 29 to 34.

CLAIMS

1. An antibody or an antigen-binding fragment thereof that selectively binds to an epitope within the core region of transglutaminase type 2 (TG2) and that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds.

2. The antibody of Claim 1, wherein the core region consists of amino acids 143 to 473 of human TG2.

3. The antibody of Claim 1 or 2, wherein the antibody or antigen-binding fragment thereof selectively binds in whole or in part to a region comprising:

i) amino acids 304 to 326 of human TG2; or

ii) amino acids 351 to 365 of human TG2; or

iii) amino acids 450 to 467 of human TG2.

4. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises one or more of the following amino acid sequences, or one or more amino acid sequence having at least 90% identity with one or more of the following amino acid sequences:

KASQDINSYLT or TCKASQDINSYLIWF or TCKASQDINSYLIWY; and/or
RTNRLFD or TLIYRTNRLFDGVP or TLIYRTNRLFDGVPXXFSGSGSGQDFF or LLIYRTNRLFDGVP or SLIYRTNRLFDGVP or LLIYRTNRLFDGVPXXFSGSGSGQDFF or SLIYRTNRLFDGVPXXFSGSGSGQDFF or LTNRLMD or LVNRLVD or XXNRLXD or LLIYRTNRLFDGVPSRFSGSGSGTDFF or SLIYRTNRLFDGVPSRFSGSGSGTDFF or SLIYLTNRLMDGVPSRFSGSGSGTDFF or TLIYLTNRLMDGVPSRFSGSGSGQEFL or SLIYLVNRLVDGVPSRFSGSGSGTDFF or ILIYLVNRLVDGVPSRFSGSGSGQDYA or TLIYLTNRLMDGVP or SLIYLTNRLMDGVP or SLIYLVNRLVDGVP or LVNRLVD or ILIYLVNRLVDGVP; and/or

LQYDDFPYT or YCLQYDDFPYTFG or LQYVDFPYT or LQYVDFPYT or LQYXDFPYT or YCLQYVDFPYTFG; and/or
SSAMS or FTLSSSAMSWVR or CXAXXFTLSSSAMSWVR or FTFSSSAMSWVR or CXAXXFTFSSSAMSWVR or THAMS or XXAMS or CAASGFTFSSSAMSWVR
or CAASGIIFSSSAMSWVR or IIFSSSAMSWVR or CAASGFTFSTHAMSWVR or FTFSTHAMSWVR or CAASGFTLSTHAMSWVR or FTLSTHAMSWVR; and/or
TISVGGGKTYYPDSVKG or WVATISVGGGKTYYPDSVKGRFTISR or WVATISVGGGKTYYPDSVKGRFTISRXNXXXXL or
WVSTISVGGGKTYYPDSVKGRFTISR or
WVSTISVGGGKTYYPDSVKGRFTISRXNXXXXL or
TISSGGRSTYYPDSVKG or
TISSGGRSTYYPDSVKG or TISXGGXXTYYPDSVKG or WVSTISVGGGKTYYPDSVKGRFTISRDNSKNTL or
WVSTISVGGGKTYYPDSVKGRFTISRDN or
WVSTISSGGRSTYYPDSVKGRFTISRDNSKNTL or
WVSTISSGGRSTYYPDSVKGRFTISRDN or
WVSTISSGGRSTYYPDSVKGRFTISR or WVATISSGGRSTYYPDSVKGRFTVSRDSSKNTL or
WVATISSGGRSTYYPDSVKGRFTVSRDS or
WVATISSGGRSTYYPDSVKGRFTVSR or
WVATISSGGRSTYYPDSVKGRFTISRDNSKNTL or
WVATISSGGRSTYYPDSVKGRFTISRDN or
WVATISSGGRSTYYPDSVKGRFTISR; and/or
LISLY or YCAKLISLYWG or LISPY or LISTY or LISXY or YCAKLISPYWG or
YCAKLISTYWG or FCARLISTYWG,
wherein X is any amino acid.

5. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof has

at least one light chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(K/Q/R)ASQ(D/G)I(N/S/R)(S/N)YL(T/N/A), for example KASQDINSYLT;

and

(R/L/V/D/A)(T/V/A)(N/S)(R/N)L(F/M/V/E/Q)(D/T/S), for example RTNRLFD;

and

(L/Q)Q(Y/H)(D/V/N)(D/T)(F/Y)P(Y/L/W)T, for example LQYDDFPYT; and/or

at least one heavy chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(S/T)(S/H/Y)AMS, for example SSAMS; and

(T/A)IS(V/S/G)(G/S)G(G/R)(K/S)TYY(P/A)DSVKG, for example TISVGGGKTYYPDSVKG; and

(L/D)(I/G)(S/G)(L/P/T/V)Y, for example LISLY.

6. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises the following amino acid sequences, or amino acid sequences having at least 90% identity with the following amino acid sequences:

(a) KASQDINSYLT (LCDR1);
LVNRLVD (LCDR2);
LQYDDFPYT (LCDR3);
THAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISTY (HCDR3); or

(b) KASQDINSYLT (LCDR1);
LTNRLMD (LCDR2);

LQYVDFPYT (LCDR3);
SSAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISPY (HCDR3); or

(c) KASQDINSYLT (LCDR1);
RTNRLFD (LCDR2);
LQYDDFPYT (LCDR3);
SSAMS (HCDR1);
TISVGGGKTYYPDSVKG (HCDR2); and
LISLY (HCDR3).

7. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof has at least one light chain variable region comprising the amino acid sequence
DIKMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFD GVPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or
DIQMTQTPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFD GVPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or
EIVLTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDG VPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK), or
DIQMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFD GVPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK1), or
EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDG VPSRFSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK (hAB-1_RKE), or
DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFD GVPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK (hAB-1_RKJ), or

AIKMTQSPSSMYASLGERVIITCKASQDINSYLTWFQQKPGKSPKTLIYLTNRLMD GVPSRFSGSGSGQEFLLTISGLEHEDMGIYYCLQYVDFPYTFGGGTKLEIK (BB-7 VK), or

DITMTQSPSSIYASLGERVTITCKASQDINSYLTWFQQKPGKSPKIL1YLVNRLVDG VPSRFSGSGSGQDYALTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (DC-1 VK), or

QIVLTQSPAIMSASPGEKVTMTCSASSSVDYMYWYQQKPGSSPRLLIYDTSNLASG VPVRFSGSGSGTSYSLTISRMGAEDAATYYCQQWNSSPLTFGAGTKLELK (DD-9 VK), or

QIVLTQSPAIMSASPGEKVTMTCSASSSVSYMYWYQQKPGSSPRLLIYDTSNLASG VPVRFSGSGSGTSYSLTISRMEAEDAATFYCQQWSSSPLTFGAGTKLELK (DH-2 VK), or

DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLTNRLMD GVPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or

DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMD GVPSRFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or

DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLVNRLVD GVPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, or

DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDG VPSRFSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK; and/or at least one heavy chain variable region comprising the amino acid sequence

EVQLVESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGG GKTYYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTT LTVSS, or

EVQLEESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGG GKTYYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTT LTVSS, or

EVQLQESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGG GKTYYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTT LTVSS (AB1_VH), or

EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGG GKTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLV TVSS (hAB-1_RHA), or

AVQLVESGGGLVKPGGSLKLSCAASGIIFSSSAMSWVRQTPEKRLEWVATISSGGR STYYPDSVKGRFTVSRDSAKNTLYLQMDSLRSEDTAIYYCAKLISPYWGQGTTLT VSS (BB-7VH), or

EVQLVESGGGLVKPGGSLKLSCAASGFTLSTHAMSWVRQTPEKRLEWVATISSGG RSTYYPDSVKGRFTISRDNVKNTLYLQLSSLRSEDTAVYFCARLISTYWGQGTTLT VSS (DC-1VH), or

QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQSSGKGLEWLAHIYWD DDKRYNPSLKSRITISKDSSSNQVFLKITSVDTADTATYYCARSWTTAPFAFWGQG TLVTVSA (DD-9 VH), or

QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQPSGKGLEWLAHIYWD DDKRYNPSLKSRLTISKDTSSNQVFLKITSVDTADTATYYCARSGTTAPFAYWGQ GTLVTVSA (DH-2 VH), or

EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLV TVSS, or

EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGR STYYPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVT VSS, or

EVQLLESGGGLVQPGGSLRLSCAASGFTFSTHAMSWVRQAPGKGLEWVSTISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISTYWGQGTLV TVSS, or

EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLV TVSS, or an amino acid sequence having at least 90% identity with one or more of the amino acid sequences specified above.

8. The antibody of any preceding claim, wherein the antibody or fragment thereof has: (a) a light chain variable region comprising the sequence

DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDG VPSRFSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLV TVSS,

or amino acid sequences having at least 90% identity therewith; or

(b) a light chain variable region comprising the sequence DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMD GVPS RFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGR STYYPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVT VSS,

or amino acid sequences having at least 90% identity therewith; or

(c) a light chain variable region comprising the sequence EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDG VPSRFSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK, or DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFDG VPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGG GKTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLV TVSS,

or amino acid sequences having at least 90% identity therewith.

9. An antibody or antigen-binding fragment thereof that inhibits human TG2 crosslinking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds, that antibody or antigen-binding fragment comprising one or more of the following amino acid sequences,

or one or more amino acid sequence having at least 90% identity with one or more of the following amino acid sequences:

KASODINSYLTor TCKASODINSYLTWF or TCKASODINSYLTWY; and/or

RTNRLFD or TLIYRTNRLFDGVP or TLIYRTNRLFDGVPXXFSGSGSGODFF

or

LLIYRTNRLFDGVP or SLIYRTNRLFDGVP or

LLIYRTNRLFDGVPXXFSGSGSGODFF or

SLIYRTNRLFDGVPXXFSGSGSGODFF or LTNRLMD or LVNRLVD or

XXNRLXD or LLIYRTNRLFDGVPSRFSGSGSGTDFF or

SLIYRTNRLFDGVPSRFSGSGSGTDFF or

SLIYLTNRLMDGVPSRFSGSGSGTDFF or

TLIYLTNRLMDGVPSRFSGSGSGOEFL or

SLIYLVNRLVDGVPSRFSGSGSGTDFF or

ILIYLVNRLVDGVPSRFSGSGSGODYA or TLIYLTNRLMDGVP or

SLIYLTNRLMDGVP or SLIYLVNRLVDGVP or LVNRLVD or

ILIYLVNRLVDGVP;

and/or

LOYDDFPYTorYCLOYDDFPYTFG or LOYVDFPYT or LOYVDFPYTor

LOYXDFPYT or YCLOYVDFPYTFG;

and/or

SSAMS or FTLSSSAMSWVR or CXAXXFTLSSSAMSWVR or

FTFSSSAMSWVR or CXAXXFTFSSSAMSWVR or THAMS or XXAMS or

CAASGFTFSSSAMSWVR or CAASGIIFSSSAMSWVR or IIFSSSAMSWVR or

CAASGFTFSTHAMSWVR or

FTFSTHAMSWVR or CAASGFTLSTHAMSWVR or FTLSTHAMSWVR; and/or

TISVGGGKTYYPDSVKG or WVATISVGGGKTYYPDSVKGRFTISR or

WVATISVGGGKTYYPDSVKGRFTISRXNXXXXL or

WVSTISVGGGKTYYPDSVKGRFTISR or

WVSTISVGGGKTYYPDSVKGRFTISRXNXXXXL or

TISSGGRSTYYPDSVKG or TISSGGRSTYYPDSVKG or

TISXGGXXTYYPDSVKG or

WVSTISVGGGKTYYPDSVKGRFTISRDNSKNTL or

WVSTISVGGGKTYYPDSVKGRFTISRDN or
WVSTISSGGRSTYYPDSVKGRFTISRDNSKNTL or
WVSTISSGGRSTYYPDSVKGRFTISRDN or
WVSTISSGGRSTYYPDSVKGRFTISR or
WVATISSGGRSTYYPDSVKGRFTVSRDSSKNTL or
WVATISSGGRSTYYPDSVKGRFTVSRDS or
WVATISSGGRSTYYPDSVKGRFTVSR or
WVATISSGGRSTYYPDSVKGRFTISRDNSKNTL or
WVATISSGGRSTYYPDSVKGRFTISRDN or
WVATISSGGRSTYYPDSVKGRFTISR; and/or
LISLY or YCAKLISLYWG or LISPY or LISTY or LISXY or YCAKLISPYWG or YCAKLISTYWG or FCARLISTYWG,
wherein X is any amino acid.

10. The antibody or antigen-binding fragment of Claim 9, wherein the antibody or antigen-binding fragment thereof has

at least one light chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(K/Q)ASQDI(N/S)(S/N)YL(T/N), for example KASQDINSYLT; and

(R/L/V/D)(T/V/A)(N/S)(R/N)L(F/M/V/E)(D/T), for example RTNRLFD; and

(L/Q)QY(D/V/N)(D/T)(F/Y)P(Y/L)T, for example LQYDDFPYT; and/or

at least one heavy chain variable region comprising the following amino acid sequences, or an amino acid sequence having at least 90% identity with the following amino acid sequences:

(S/T)(S/H/Y)AMS, for example SSAMS; and

(T/A)IS(V/S/G)(G/S)G(G/R)(K/S)TYY(P/A)DSVKG, for example TISVGGGKTYYPDSVKG; and

(L/D)(I/G)(S/G)(L/P/T/V)Y, for example LISLY.

11. The antibody of claim 9 or 10, wherein the antibody or antigen-binding fragment thereof comprises the following amino acid sequences, or amino acid sequences having at least 90% identity with the following amino acid sequences:

(b) KASQDINSYLT (LCDR1);
LVNRLVD (LCDR2);
LQYDDFPYT (LCDR3);
THAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISTY (HCDR3); or

(b) KASQDINSYLT (LCDR1);
LTNRLMD (LCDR2);
LQYVDFPYT (LCDR3);
SSAMS (HCDR1);
TISSGGRSTYYPDSVKG (HCDR2); and
LISPY (HCDR3); or

(d) KASQDINSYLT (LCDR1);
RTNRLFD (LCDR2);
LQYDDFPYT (LCDR3);
SSAMS (HCDR1);
TISVGGGKTYYPDSVKG (HCDR2); and
LISLY (HCDR3).

12. The antibody or antigen-binding fragment of Claim 9, 10 or 11, wherein the antibody or antigen-binding fragment thereof has at least one light chain variable region comprising the amino acid sequence
DIKMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFD
GVPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or
DIQMTQTPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFD
GVPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK, or

EIVLTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFDG VPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK), or

DIQMTQSPSSMYASLGERVTITCKASQDINSYLTWFQQKPGKSPKTLIYRTNRLFD GVPSRFSGSGSGQDFFLTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (AB-1_VK1), or

EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDG VPSRFSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK (hAB-1_RKE), or

DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFDG VPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK (hAB-1_RKJ), or

AIKMTQSPSSMYASLGERVIITCKASQDINSYLTWFQQKPGKSPKTLIYLTNRLMD GVPSRFSGSGSGQEFLLTISGLEHEDMGIYYCLQYVDFPYTFGGGTKLEIK (BB-7 VK), or

DITMTQSPSSIYASLGERVTITCKASQDINSYLTWFQQKPGKSPKILIYLVNRLVDG VPSRFSGSGSGQDYALTISSLEYEDMGIYYCLQYDDFPYTFGGGTKLEIK (DC-1 VK), or

QIVLTQSPAIMSASPGEKVTMTCSASSSVDYMYWYQQKPGSSPRLLIYDTSNLASG VPVRFSGSGSGTSYSLTISRMGAEDAATYYCQQWNSSPLTFGAGTKLELK (DD-9 VK), or

QIVLTQSPAIMSASPGEKVTMTCSASSSVSYMYWYQQKPGSSPRLLIYDTSNLASG VPVRFSGSGSGTSYSLTISRMEAEDAATFYCQQWSSSPLTFGAGTKLELK (DH-2 VK), or

DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLTNRLMD GVPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or

DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMD GVPSRFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, or

DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYLVNRLVD GVPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, or

DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDG VPSRFSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK; and/or at least one heavy chain variable region comprising the amino acid sequence EVQLVESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGG GKTYYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTT LTVSS, or EVQLEESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGG GKTYYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTT LTVSS, or EVQLQESGGGLVKPGGSLKLSCAASGFTLSSSAMSWVRQTPDRRLEWVATISVGG GKTYYPDSVKGRFTISRDNAKNTLYLQMNSLRSEDTAMYYCAKLISLYWGQGTT LTVSS (AB1_VH), or EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGG GKTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLV TVSS(hAB-1_RHA), or AVQLVESGGGLVKPGGSLKLSCAASGIIFSSSAMSWVRQTPEKRLEWVATISSGGR STYYPDSVKGRFTVSRDSAKNTLYLQMDSLRSEDTAIYYCAKLISPYWGQGTTLT VSS (BB-7VH), or EVQLVESGGGLVKPGGSLKLSCAASGFTLSTHAMSWVRQTPEKRLEWVATISSGG RSTYYPDSVKGRFTISRDNVKNTLYLQLSSLRSEDTAVYFCARLISTYWGQGTTLT VSS (DC-1VH), or QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQSSGKGLEWLAHIYWD DDKRYNPSLKSRITISKDSSSNQVFLKITSVDTADTATYYCARSWTTAPFAFWGQG TLVTVSA (DD-9 VH), or QVTLKESGPGILQPSQTLSLTCSFSGFSLSTSGMGVSWIRQPSGKGLEWLAHIYWD DDKRYNPSLKSRLTISKDTSSNQVFLKITSVDTADTATYYCARSGTTAPFAYWGQ GTLVTVSA (DH-2 VH), or EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLV TVSS, or

EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGR STYYPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVT VSS, or

EVQLLESGGGLVQPGGSLRLSCAASGFTFSTHAMSWVRQAPGKGLEWVSTISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISTYWGQGTLV TVSS, or

EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLV TVSS, or

an amino acid sequence having at least 90% identity with one or more of the amino acid sequences specified above.

13. The antibody of anyone of claims 9 to 12, wherein the antibody or fragment thereof has:

(a) a light chain variable region comprising the sequence DITMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKILIYLVNRLVDG VPSRFSGSGSGQDYALTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence EVQLLESGGGLVQPGGSLRLSCAASGFTLSTHAMSWVRQAPGKGLEWVATISSGG RSTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYFCARLISTYWGQGTLV TVSS,

or amino acid sequences having at least 90% identity therewith; or

(b) a light chain variable region comprising the sequence DIKMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKTLIYLTNRLMD GVPSRFSGSGSGQEFLLTISSLQPEDFATYYCLQYVDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence EVQLLESGGGLVQPGGSLRLSCAASGIIFSSSAMSWVRQAPGKGLEWVATISSGGR STYYPDSVKGRFTVSRDSSKNTLYLQMNSLRAEDTAVYYCAKLISPYWGQGTLVT VSS,

or amino acid sequences having at least 90% identity therewith; or

(c) a light chain variable region comprising the sequence EIVLTQSPSSLSASVGDRVTITCKASQDINSYLTWYQQKPGKAPKLLIYRTNRLFDG VPSRFSGSGSGTDFFFTISSLQPEDFGTYYCLQYDDFPYTFGGGTKLEIK, or DIQMTQSPSSLSASVGDRVTITCKASQDINSYLTWFQQKPGKAPKSLIYRTNRLFD GVPSRFSGSGSGTDFFLTISSLQPEDFATYYCLQYDDFPYTFGQGTKVEIK, and a heavy chain variable region comprising the sequence EVQLLESGGGLVQPGGSLRLSCAASGFTFSSSAMSWVRQAPGKGLEWVSTISVGG GKTYYPDSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAKLISLYWGQGTLV TVSS,

or amino acid sequences having at least 90% identity therewith.

14. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises or consists of an intact antibody.

15. The antibody of any preceding claim, wherein the antibody or antigen-binding fragment thereof comprises or consists of an antigen-binding fragment selected from the group consisting of: an Fv fragment, for example a single chain Fv fragment or a disulphide-bonded Fv fragment; an Fab fragment; and an Fab-like fragment, for example an Fab' fragment or an $F(ab)_2$ fragment.

16. The antibody of any preceding claim, which is an IgG1, IgG2, IgG3 or IgG4.

17. A polynucleotide encoding an antibody or an antigen-binding fragment thereof according to any of Claims 9 to 16.

18. An antibody according to any of Claims 1 to 16, wherein the antibody or antigen-binding fragment thereof does not inhibit TG1, TG3, TG13 and/or TG7 activity.

19. An antibody or antigen-binding fragment thereof, that selectively binds to an epitope within the core region of transglutaminase type 2 (TG2) and that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds,

whose binding to TG2, for example human TG2, is inhibited or reduced when an antibody according to any of Claims 1 to 16, 18 is bound to TG2, for example human TG2.

20. A compound comprising an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, 18 or 19 and a further moiety, for example a readily detectable moiety, and/or a directly or indirectly cytotoxic moiety.

21. A pharmaceutical composition/formulation comprising an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, in admixture with a pharmaceutically acceptable excipient, adjuvant, diluent or carrier.

22. The pharmaceutical composition/formulation according to Claim 21 further comprising one or more further active ingredients.

23. The pharmaceutical composition/formulation according to Claim 21 or 22, wherein the composition/formulation is formulated for intravenous, intramuscular, or subcutaneous delivery to a patient.

24. A kit of parts comprising an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20; and a further agent.

25. An antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, for use in medicine.

26. Use of an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, in the manufacture of a medicament for treating and/or diagnosing Celiac disease, abnormal wound healing, scarring, scleroderma, keloids and hypertrophic scars,

ocular scarring, inflammatory bowel disease, macular degeneration, Grave's opthalmopathy, drug-induced ergotism, psoriasis, fibrosis-related diseases (e.g. liver fibrosis, pulmonary fibrosis such as interstitial lung disease and fibrotic lung disease, cardiac fibrosis, skin fibrosis, myelofibrosis, kidney fibrosis such as glomerulosclerosis and tubulointerstitial fibrosis), atherosclerosis, restenosis, inflammatory diseases, autoimmune diseases, neurodegenerative/neurological diseases (e.g. Huntington's Disease, Alzheimer's disease, Parkinson's disease, polyglutamine disease, spinobulbar muscular atrophy, dentatorubral-pallidoluysian atrophy, spinocerebellar ataxias 1, 2, 3, 6, 7 and 12, rubropallidal atrophy, spinocerebellar palsy), and/or cancer (e.g. glioblastomas such as glioblastoma in Li-Fraumeni syndrome and sporadic glioblastoma, malignant melanomas, pancreatic ductal adenocarcinomas, myeloid leukemia, acute myelogenous leukemia, myelodysplastic syndrome, myeloproliferative syndrome, gynaecological cancer, Kaposi's sarcoma, Hansen's disease, collagenous colitis).

27. An *in vitro* method of reducing or inhibiting TG2 enzyme activity, the method comprising administering an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 or a polynucleotide according to Claim 17, or a compound according to Claim 20, to a sample comprising TG2, for example a tissue or cell sample comprising TG2.

28. A method of producing an antibody or antigen-binding fragment thereof according to any of Claims 9 to 16, or 18 to 19, or a compound according to Claim 20, the method comprising expressing a polynucleotide according to Claim 17.

29. A method of selecting an antibody or antigen-binding fragment thereof that selectively binds a transglutaminase protein and that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds, the method comprising the step of selecting an antibody or antigen-binding fragment thereof that selectively binds a polypeptide comprising a transglutaminase core region/catalytic domain but not comprising a transglutaminase barrel or sandwich domain.

30. A method of producing an antibody or antigen-binding fragment thereof that selectively binds a transglutaminase protein and that inhibits human TG2 cross-linking lysine and glutamine with Nε(γ-glutamyl)lysine isopeptide bonds, the method comprising administering to a non-human animal a compound comprising:

i) a polypeptide comprising a transglutaminase core region/catalytic domain but not comprising a transglutaminase barrel or sandwich domain, or a fragment thereof; and, optionally,

ii) an adjuvant.

31. A method of producing an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 comprising the step of selecting an antibody or antigen-binding fragment thereof that selectively binds a polypeptide sequence consisting of the polypeptide sequence of amino acids 143 to 473 of human TG2 or a fragment thereof.

32. A method of producing an antibody or antigen-binding fragment thereof according to any of Claims 1 to 16, or 18 to 19 comprising administering to a non-human animal a compound comprising:

i) a polypeptide sequence consisting of the polypeptide sequence of amino acids 143 to 473 of human TG2 or a fragment thereof; and optionally,

ii) an adjuvant.

33. The method of Claim 30 or 32 further comprising the step of selecting an antibody or antigen-binding fragment thereof that selectively binds a transglutaminase protein, for example a TG2 such as human TG2.

34. An antibody or antigen-binding fragment thereof obtainable by the method of any of Claims 28 to 33.